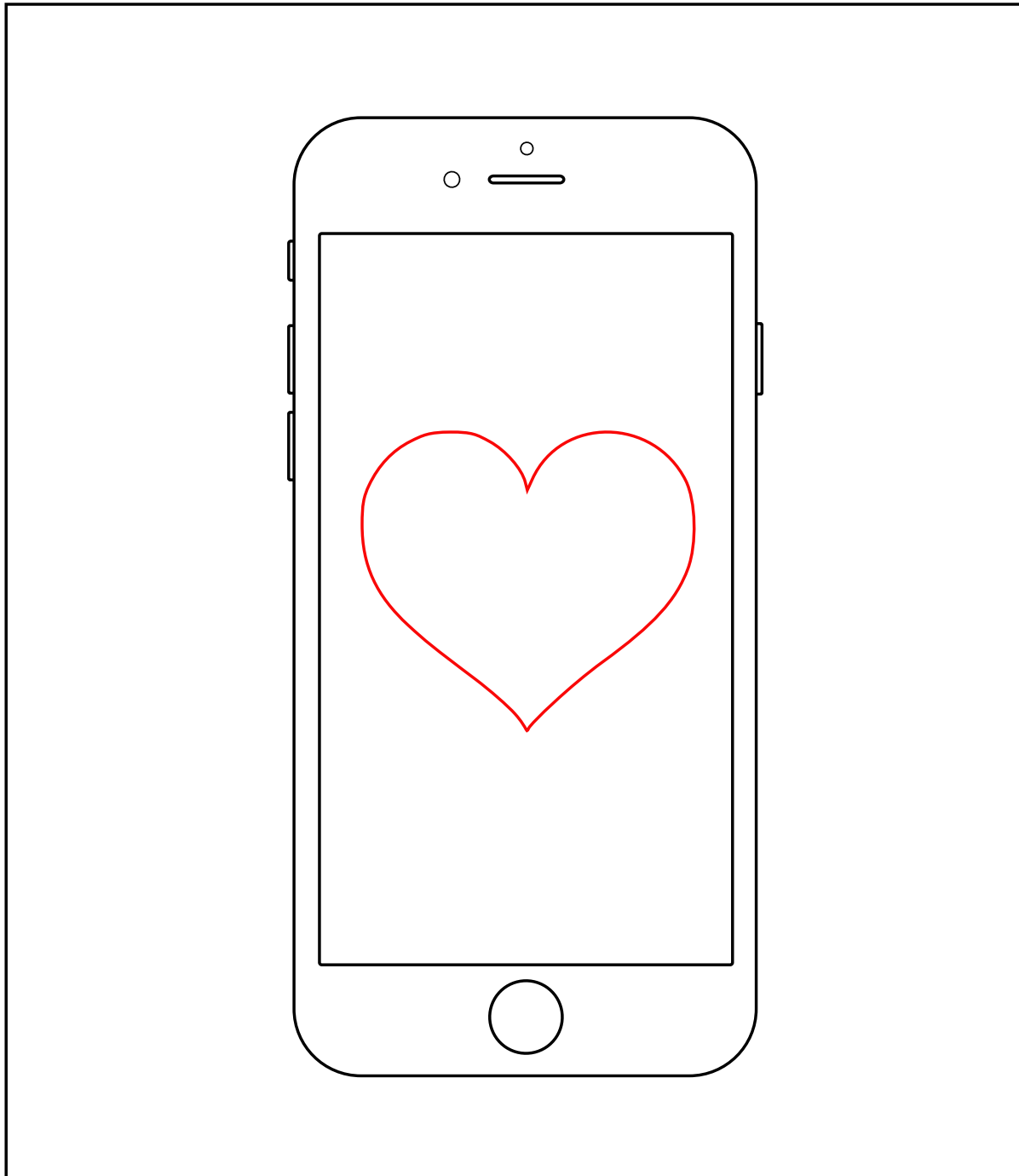


The Fibreculture Journal

DIGITAL MEDIA + NETWORKS + TRANSDISCIPLINARY CRITIQUE



Issue 25 : 2015

Apps and Affect

edited by Svitlana Matviyenko, Nandita Biswas Mellamphy,
Nick Dyer-Witheford, Alison Hearn, and Andrew Murphie.



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About the Fibreculture Journal

The Fibreculture Journal is a peer reviewed international journal, first published in 2003 to explore the issues and ideas of concern to the Fibreculture network.

The Fibreculture Journal now serves wider social formations across the international community of those thinking critically about, and working with, contemporary digital and networked media.

The Fibreculture Journal has an international Editorial Board and Committee.

In 2008, the Fibreculture Journal became a part of the Open Humanities Press , a key initiative in the development of the Open Access journal community.

In 2012 the Fibreculture Journal celebrated ten years of open access scholarly publishing with the publication of its 20th Issue.

The journal encourages critical and speculative interventions in the debate and discussions concerning a wide range of topics of interest. These include the social and cultural contexts, philosophy and politics of contemporary media technologies and events, with a special emphasis on the ongoing social, technical and conceptual transitions involved. More specific topics of interest might include:

- :: informational logics and codes
- :: the possibilities of socio-technical invention and sustainability
- :: the transdisciplinary impacts of new media technologies and events in fields such as education, the biosciences, publishing or knowledge management
- :: information and creative industries, media innovation, and their critique
- :: national and international strategies for innovation, research and development
- :: contemporary media arts
- :: new forms of collaborative constitution made possible by contemporary media
- :: software and hardware develops in relation to the social
- :: networks :: media change, convergence and divergence
- :: the use of contemporary media in socio-technical interventions

The Fibreculture Journal encourages submissions that extend research into critical and investigative networked theories, knowledges and practices.

The Fibreculture Journal values academic scholarship in the field, and demonstrates this through the publication of refereed articles. The journal is fully supportive of Open Access communities and practices, and is committed to contemporary metadata provisions and uses. It is also open to expanded notions of scholarship which might include collaborative hypertexts, database compositions, and low-band electronic installations that experiment with the philosophy, politics and culture of information and communication technologies.

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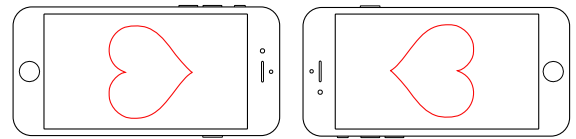
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issue 25 : Apps and Affect 2015



Editorial:

Nandita Biswas Mellamphy, Nick Dyer-Witheford,
Alison Hearn, and Svitlana Matviyenko

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In William Gibson's recent futurist novel *The Peripheral*, the planet has been devastated by a massive eco-techno-political catastrophe ('the jackpot') but remaining inhabitants are still able to enjoy the luxury of activating digital devices simply by tapping their tongues on the roof of their mouths. This touch is sufficient to set into play systems that communicate across space and time – enabling the establishment of connections back in time, for example, to people closer to our own present-day, for whom mobiles are still (somewhat) separate from the body. Thirty years ago, in his first novel *Neuromancer*, Gibson immortalised cyberspace with the account of what now sounds like an amazingly clunky process whereby the hero 'jacks-in' to virtual reality. But in *The Peripheral* the process of translation and transition into networks is streamlined – occluded, internal, intimate and implanted – right at the tip of the tongue.

This issue of *the Fibreculture Journal* explores a moment along this hypothetical trajectory by investigating the contemporary intersection of 'Apps and Affect', publishing papers from

a conference of that name organised in October 2013 by faculty and students at Western University (specifically from its Faculty of Information and Media Studies and Center for the Study of Theory and Criticism). By recognising apps as objects that are related to the constitution of subjects, as a component of biopolitical assemblages, and as a means of digital production and consumption, our conference aimed to make an intervention in what had – since the announcements of the App-Store and the iPhone3 in 2008 – been a largely technical and rather technophilic public discussion of apps.

Isn't it paradoxical, we asked, that instead of becoming 'transparent' and 'invisible' – as envisioned by the thinkers of ubiquitous computing *decades ago* – the app-ecosystem manifests itself as *permanent excess*: excessive downloads, excessive connections, excessive proximity, excessive 'friends'-qua-'contacts', excessive speeds and excessive amounts of information? How does the app as 'technique' (Tenner), indeed as 'cultural technique' (Siegert) and as 'technics' (Stiegler), channel our ways of maintaining relations with/in the media environment? Do the specific and circumscribed operations of individual applications *foster* or *foreclose* what media theorists call the transformative and transductive potential of collective technological individuation (Simondon)? How might we think about the social, political and technical implications of this movement away from open-ended networks like the internet towards specific, focused, and individualised modes of computing? Do apps represent 'a new reticular condition of trans-individuation grammatising new forms of social relations' (Stiegler) or do they signal instead the triumph of 'regulatory' networks over 'generative' ones (Zittrain)? If apps are micro-programs residing by the hundreds and thousands on cell-phones, mobile-devices and tablets, and affects are corporeal excitements (and depressions) running beneath and beyond cognition, what is the relation of apps to affects?

The App as 'Object' and 'Process' One of the unanticipated aspects of the conference – a surprise, but of the sort we hoped for – was the intensity of discussions during several Q&A sessions on the then-current question of 'object oriented ontology'. As readers of *The Fibreculture Journal* will be well aware, the rapid digital developments in which the app operates as representative relation and/or object have been accompanied by new trends in and on the margins of media theory, such as speculative realism/new-materialism/'ooo' – trends that have sometimes (dare we say often?) provoked strong criticism. Apps, it seems, are particularly potent activators of such discussions, perhaps because these tiny mobile programs appear to exemplify the process in which things become more life-like and humans more thing-infested – a development to which Donna Haraway (1985) pointed over twenty years ago.

In a keynote talk 'Life's an App for Geo-cosmic Processes', Edward Keller provocatively

claimed that the app is not a representational or interpretive tool, but rather the instantiation of an abstract model that predates the existence of ‘apps’ *per se*. Suggesting that ‘the human platform’ can be conceptualised as one layer in a geo-cosmic network – within which consciousness might be merely an evolutionary aberration – he proposed that every ‘thing’ (including every human) is, in this system, an ‘app’ for something else. If we approach the app in this manner, Keller argued, we might discover a range of agencies that our current mainstream idea of apps – and indeed, of bodies and subjectivities – does not acknowledge properly.

The issues raised by such perspectives were further highlighted in an exchange between two more of the conference’s keynote speakers, Patricia Ticineto Clough and Alexander R. Galloway, which we subsequently formalised into the conversation moderated by Svitlana Matviyenko and published here as ‘On Governance, Blackboxing, Measure, Body, Affect and Apps’. For Clough, the world of information is a world of all mediation *all of the time*: its non-stop solicitation, generation, algorithmic parsing, and unpredictable ‘networked and distributed relations’ – of which apps are paradigmatic – obviate notions of ‘closed systems’, distinct objects or organisms. The myth of autopoiesis has been shattered; in its wake, she proposes the emergence of new forms of (non-conscious) subjectivity. The ‘speculative’ subject of big data is focused, not on an holistic form of self-representation or self-knowledge, or even self-interest, but rather on the maintenance of malleable sets of anticipatory and liquid capacities, which can change and adapt to new (presumably algorithmically computed) forms of appreciation and depreciation generated from elsewhere.

But no matter how radical its claims, speculative philosophies (such as object-oriented ontology) do not a politics make – although they most certainly can have sets of unforeseen political consequences. As Galloway argues, despite the claim of ‘political potential’ made by object oriented ontologists, their position ‘removes the point of decision from people (the demos) to the object world at large’ (2012). Since it has no way of distinguishing between ‘good’ and ‘bad’ objects, because it de-privileges consciousness and people, and because there is no way of generating a dynamics of contestation and argument in a flat ontology, this theory has no room for judgment – a crucial element of any political project. If, indeed, we are no longer ruled by ‘the Father or the Prince’ but instead ‘by the packet, the data point, the unit of legible meaning’ as Galloway claims here, we do ourselves no good by simply echoing or mirroring those operations in our critical models and forms.

Software’s ‘*Prosthetic Impulse*’ Given the conference agenda, it is hardly surprising that many of the contributions to the conference and to this issue of *Fibreculture* occupy – both

internally and in their inter-relations – a productively multi-disciplinary ground located between ‘software studies’, ‘cultural and media studies’ and psychoanalytic perspectives.

In ‘*Spotify has Added an Event to your Past: (Re)writing the Self through Facebook’s Autoposting Apps*’ (a title strangely reminiscent of Gibson’s time-travel fiction) Tanya Kant argues that if Facebook apps are considered to be ‘tools’ for self-writing, self-expression and identity performance, then the capacity of apps to write in the user’s stead – at times without the user’s knowledge or explicit consent – works to intervene in and, on occasion, disrupt users’ staged self-performances. Jeremy Wade Morris and Evan Elkins trace the lineage of the app and contextualise it within the history of the software commodity in ‘*There’s a History for That: Apps and Mundane Software as Commodity*’; they argue that apps represent an affective and contextual experience of software that expands its potential range of uses but also increases its influence over everyday practices. Frédéric Lesage proposes in his essay that we rethink the ways in which software design posits, configures, and arguably entrenches ‘pre-existing classificatory distinctions between elite and popular or mainstream and exceptional’. He goes on to develop the concept of ‘middlebrowware’ as a way to assess the processes of symbolic ordering that take place in and through the design and use of certain kinds of media software, using Photoshop as a case study. In ‘*iHootenanny: A Folk Archeology of Social Media*’, Henry Svec excavates models of communication in the histories of American folk revivalism and digital culture, linking the populist Hootenanny to the utopian vision of a community joined in song taken up by ‘social music’ iPhone apps. And Svitlana Matviyenko’s ‘*Interpassive User: Complicity and the Returns of Cybernetics*’ activates Lacanian themes in and through an examination of cybernetic thought, specifically the notions of ‘extension’ and ‘prosthesis’, proposing that these concepts map onto the logics of metaphor and metonymy as well as surplus and lack. Through this analysis, she raises questions about the complicity of users in their compulsive use of apps, reconfiguring Slavoj Žižek’s notion of ‘interpassivity’, initially used by him to address the dynamics of the relation between owners and the digital toy tamagotchi, in order to suggest that this new app logic involves a similar ‘double deception’. Here, ‘the subject pretends to pretend: the user pretends to be *passive* by engaging in rather meaningless *activity*, avoiding *acting* or refusing *agency*, which would require the condition of another, less comfortable, *passivity* by stepping off the grid’.

Political Economy of the App

These issues bear on one aspect of the conference perhaps underrepresented in this collection: analysis of the political economy of apps and their insertion within digital capitalism. This issue is certainly alluded to in several papers here, and is a central concern

of others. A number of the conference-paper contributions in this area have, however, been published elsewhere (for instance those of Jodi Dean, Renyi Hong, Nick Dyer-Witheford, Nandita Biswas Mellamphy and Dan Mellamphy, Vincent Manzerolle and Atle Mikkola Kjösen, as well as Enda Brophy and Greig de Peuter): contributions which we would like to mention as readings complementary to this issue of *The Fibreculture Journal*.

The political economy of the app, as a topic, was broached by Dean in her opening plenary on 'Apps and Drive', published in *Theories of the Mobile Internet: Materialities and Imaginaries* (Routledge, 2014). This established a broad politico-psychoanalytic analysis of the way in which apps operate as devices of attraction and captivation that tie us affectively to exploitative networks of production and circulation. Papers delivered later in the conference explored parts of this process in greater detail. For example, two papers delivered by Manzerolle and Kjösen on apps' role in the digitally-accelerated circulation of capital via targeted advertisement, the culling of consumer data, and mobile finance, have been effectively combined into a single co-authored piece appearing in *The Imaginary App* (MIT Press, 2014), where Mellamphy and Biswas Mellamphy's original conference-paper – a different essay from the one they contribute to this volume – also appears: this anthology being, in many respects, a companion-volume to the conference and this issue of *the Fibreculture Journal*.

Other conference-participants journeyed into the "hidden abode" of app-production, where the promise of app-entrepreneurialism has attracted thousands of young (predominantly male) free labourers to the creation of apps, whose sale in the app store, in turn, provides them with little (often zero) remuneration and eliminates the need for platform providers to conduct extensive research and development. Hong's study of this dynamic within the virtual game industry, presented at the conference, has appeared as 'Game Modding, Prosumerism and Neoliberal Labor Practices' in the *International Journal of Communication* (2013). Dyer-Witheford's 'App Worker', which looks at the empirical evidence about the app economy and the polarised patterns of splendour and misery followed by independent app developers appears in *The Imaginary App*. Brophy and de Peuter's 'Labours of Mobility: Communicative Capitalism and the Smartphone Cybertariat' (which appears in *Theories of the Mobile Internet*) makes a crucial enlargement of the scope of app labour analysis by placing it within the broader circuit of mobile phone production – one that also includes extraction in the mining of coltan and other minerals, assembly in the factories of Foxconn, the sales and servicing of smart phones from call centres, and disassembly in toxic waste dumps scavenged for metallic residues.

Even though a number of political-economic papers have found a destination elsewhere, this aspect of the app is by no means absent from this issue of *Fibreculture*. Mellamphy and

Biswas Mellamphy's essay for this volume, '*An Algorithmic Agarthā: Post-App Approaches to Synarchic Regulation*', explores the political and socio-cultural implications of apps – especially via algorithmic regulation – in the context of contemporary planetary regimes of information governance. They argue that we can no longer naïvely hold onto the view espoused by techno-optimists that new technologies reduce regulation and increase oversight in addition to the production of desirable outcomes, but, rather, should expect increases in the politico-military, market-economic, and techno-scientific regulation of behaviours and activities by way of increasingly intelligent complex information-processes.

Keynote speaker Melissa Gregg's '*Hack for Good: Speculative Labor, App Development and the Burden of Austerity*' speaks to the *production* side of the app economy and provides a fascinating overview of civic "hackathons", examining their promotion as a 'new form of community service' and their relationship to austerity, unpaid labor, and creative industries. Her description of an 'indentured cognitariat of our time' paints an extremely bleak picture in which the radical potential of the hacker is now tethered to US patriotism and entrepreneurial forms of citizenship.

Finally, Mark Andrejevic's '*The Droning of Experience*' paints an extraordinarily disturbing picture of both work and consumption in the app era. Andrejevic, another of our conference keynotes, deploys the figure of the drone to describe the ways human experience and interpretive capacity is not only undermined but bypassed entirely as the result of the 'emerging logic of portable, always-on, distributed, ubiquitous, and automated information capture'. The drone encapsulates the practices of automating sense making and response, registering economically productive patterns and anomalies at a preconscious level, displacing human judgment and focusing solely on humans' autonomic reflexes in practices such as sentiment analysis and mood monitoring. This situation, Andrejevic argues, 'transform[s] humans into networked, sensing devices'. While Marx in his famous '*Fragment on Machines*' saw capitalist technology culminating in a machinic system where humans figured only residually as 'conscious linkages', in Andrejevic's account this supplementary role has been downgraded even further to that of 'pre-conscious linkage', so that the human has truly become the 'appendage of the machine.'

In Mellamphy and Biswas Mellamphy's account of globally-reticulated synarchic regulation, Gregg's description of the corporate and state-sponsored recuperation of free hacker-labour, and Andrejevic's account of a de-skilling process that strips out consciousness itself as an unneeded attribute of laboring and consuming meat-puppets, we see the app as a technology whose excitements usher-in a new level of capitalist subsumption. One of the central questions that this Special Issue of *the Fibreculture Journal* poses but leaves unanswered is that of the oppositional forms adequate to counter the blizzard of capitalist

techno-power, whose inhuman force is disguised by the cheerful multi-colored app-dots that compose it. It is our hope that the articles included here will inspire others to take up this question and to continue the critically important debates about apps and affects.

Biographical Notes

Nandita Biswas Mellamphy is Associate Professor of Political Theory in the Department of Political Science at Western. She is the author of *The Three Stigmata of Friedrich Nietzsche: Political Physiology in the Age of Nihilism* (Palgrave, 2010).

Nick Dyer-Witheford is Associate Professor in the Faculty of Information and Media Studies at University of Western Ontario. He is author of *Cyber-Marx: Cycles and Circuits of Struggle in High-Technology Capitalism* (University of Illinois, 1999), and co-author, with Stephen Kline and Greig de Peuter of *Digital Play: The Interaction of Technology, Culture, and Marketing* (McGill-Queen's, 2003), and with Greig de Peuter of *Games of Empire: Global Capitalism and Video Games* (Minneapolis: University of Minnesota Press, 2009). His forthcoming book is *Cyber-Proletariat: Global Labour In The Digital Vortex* (Pluto Press, 2015).

Alison Hearn is an Associate Professor, Faculty of Information and Media Studies, University of Western Ontario. She has taught at the School of Communication at Simon Fraser University, the Humanities Program at the University of Toronto, Cultural Studies at Trent University and Communication Studies at Northeastern University. Her work combines cultural theory with critical political economy and focuses primarily on the intersections of visual culture, consumer culture, reality television, new media, and self-production. She also writes on the history of the university as a cultural site. She has published in such journals as *Topia*, *Continuum*, *History of Intellectual Culture*, and *The International Journal of Media and Culture*, and in edited volumes including *The Celebrity Culture Reader*, *Reality TV: Remaking Television Culture*, 2nd edition, and *The Media and Social Theory*. She is co-author of *Outside the Lines: Issues in Interdisciplinary Research* (McGill-Queens University Press, 1997). Currently, Professor Hearn is working on a book about reality television entitled *Real Incorporated: Explorations in reality television and contemporary visual culture*.

Svitlana Matviyenko is a Lecturer at the University of Western Ontario. She has a PhD in Critical Theory, Media Theory and Psychoanalysis from the University of Missouri and she

is now pursuing her second doctorate at the Centre for the Study of Theory and Criticism at the University of Western Ontario. She writes on psychoanalysis, topology, posthumanism, mobile apps, and networking drive. Her work has been published and forthcoming in *Digital Creativity*, *(Re)-Turn: A Journal of Lacanian Studies*, *Harvard Ukrainian Studies*, *Krytyka* and others. Svitlana curated several experimental dance performances and several art exhibitions at the Ukrainian Institute of America in NYC, Museum I London (Ontario) and other venues. She is a co-editor (with Paul D. Miller) of *The Imaginary App* (MIT, 2014).

Notes

[1] This issue of *the Fibreculture Journal* was edited by Svitlana Matviyenko, Nandita Biswas Mellamphy, Nick Dyer-Witheford, Alison Hearn, and Andrew Murphie.

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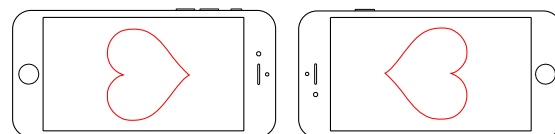
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issue 25: Apps and Affect.



FCJ-179 On Governance, Blackboxing, Measure, Body, Affect and Apps: A conversation with Patricia Ticineto Clough and Alexander R. Galloway

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Abstract:

The work of Patricia Ticineto Clough and Alexander Galloway is well known to anyone whose research concerns matters of affect and biopolitics, software, networks and gaming, interface culture and communication, political economy of media and information, the systems of measure and control addressed in the contexts of French theory, feminist and speculative thought, Marxism or psychoanalysis. We were lucky to have them among the keynotes for our Apps and Affect conference, where their talks sparked an interesting exchange that impacted a number of the conference conversations. Afterwards, I suggested to Patricia and Alex that they elaborate on aspects of their discussion, this invitation resulted in the following conversation, which took place via email between April and December 2014.

Introduction

The work of these two authors is well known to anyone whose research concerns matters of affect and biopolitics, software, networks and gaming, interface culture and communication, political economy of media and information, the systems of measure and control addressed in the contexts of French theory, feminist and speculative thought, Marxism or psychoanalysis. We were lucky to have them among the keynotes for our Apps and Affect conference, where their talks sparked an interesting exchange that impacted a number of the conference conversations. Afterwards, I suggested to Patricia and Alex that they elaborate on aspects of their discussion; this invitation resulted in the following conversation, which took place via email between April and December 2014.

Patricia Ticineto Clough is a Professor of Sociology and Women's Studies at Queens College and the Graduate Center, CUNY. She is a social theorist whose work and teaching address the methods of inquiry and the core assumptions of such fields as anthropology and sociology in order to shift the focus towards their disciplinary peripheries where one often discovers the archives of outcast material. Clough's co-edited collections *The Affective Turn* (with Jean Halley) and *Beyond Biopolitics* (with Craig Willse) are evidence of passionate collaborative research conducted with her students and colleagues, offering nuanced discussions on discursive closures, shifts and reconfigurations. Her work outlines the dangers and controversies of 'the political economy of biomediated body' (Clough, 2008:15) implemented by the 'monitoring of the bodily affect as information' within national and international regulatory policies.

Clough's current research looks at what she and her collaborators have termed 'the datalogical turn' (Clough et al., 2014), [1] or the shift to big data as a sociological methodology. She argues that such a move from representational to non-representational model reveals how much sociology has been merged with cybernetics. Clough explores algorithmic technologies of measure, the indeterminacy of incomputable data, and informational matter. [2] In all her texts Clough experiments with ways of inhabiting and performing the written. She does it even more intensely in her performances, one of which I was lucky to witness last fall in New York City: *Ecstatic Corona*, her ethnographic and historical research written, choreographed and produced together with young adults whom she met on her multiple returns home, to the town of Corona Queens New York, where she grew up.



Figure 1. Patricia Ticineto Clough, Omar Montana, Mac Morris, Elijah Kuan Wong, Elizabeth Garcia (missing) co-producers and performers of *The Children of the Mercy Files*. (2014).

Alexander R. Galloway is an Associate Professor in the Department of Media, Culture, and Communication at New York University. His theoretical trilogy on ‘allegories of control’ – *Protocol: How Control Exists After Decentralization* (2004), *Gaming: Essays on Algorithmic Culture* (2006) and *The Interface Effect* (2012) – became foundational for Media and Software Studies, where he made an equally important contribution as a programmer and media artist. From 1996 to 2002 Galloway was associated with Rhizome, a New York based new media organisation, where he worked as editor and technical director. He also founded Radical Software Group (RSG), a collective of media artists named after *Radical Software* magazine, published between 1971 and 1974, which explored the impact of video and television on society, fought for the freedom of information and warned against the dangers of its corporate control. [3] Twenty years later, RSG reintroduced similar concerns to the digital culture of the 1990s and 2000s. The group’s media art projects responded to the gross militarisation of the governmental apparatus not only in the aftermath of 9/11, but years prior to those tragic events.

One of the works of this kind was Galloway’s *Carnivore*, a project whose name doubled that of the FBI’s wiretapping software better known as DCS1000 (‘Digital Collection System’). [4] By pointing to the infamous surveillance tool, his software art project exposed

the practice of the massive monitoring of users' online activity conducted since 1997, shortly after the World Wide Web become publicly available. Even though art cannot, unfortunately, entirely strip the system of its powers, it certainly can – and does – throw those powers into question. Carnivore is a hack at its best: just like its prototype, it is 'a surveillance tool for data networks,' 'a software application that listens to all Internet traffic (email, web surfing, etc.)'. [5] But it is also more than that: in addition to its ironic mimicking, Galloway's Carnivore subverts the FBI's surveillance technique by... *improving* the tool: now it 'features exciting new functionality including: artist-made diagnostic clients, remote access, full subject targeting, full data targeting, volume buffering, transport protocol filtering, and an open source software license.' Most importantly, it breaks a closed system and uses data for art; this is consistent with Galloway and Eugene Thacker's suggestion of an important substitution for the ineffective practices of resistance to the protocological control: 'The strategy of maneuvers instead shows that the best way to beat an enemy is to become a better enemy' (Galloway and Thacker, 2007: 98).

Galloway's recent interest in French thinker François Laruelle, whose work is indeed a search for *exploits* in philosophy, resulted in a new book *Laruelle: Against the Digital* (2014), where he speculates about the meaning, possibilities and limitations of digitality by reading Laruelle's theory of "philosophical decision", which, Galloway argues, could be seen as *digitalisation* – here, as digitalisation of thought – an operation of discretisation disconnected from the computational context. This book continues his method of tactical 'protocological struggle', in which the convergence of different modes of critical expression are put forward in order to demonstrate that today 'any theory addressing networks,' as he and Thacker write in *The Exploit*, 'will have to entertain a willingness to theorize at the technical level' (Galloway and Thacker, 2007: 100).

Svitlana Matviyenko

Svitlana Matviyenko: Patricia, in your work, you think the body across various platforms where it is a platform itself, one of many. In one of your talks you speak of the work of Karen Barad, who, like you, questions the organism as the privileged figure of the body. With Barad and other new materialists, you address the question of embodiment as it occurs through systems, techniques and tools for measuring, and you argue that 'the body is inseparable from the materialisations that materialize through the measuring apparatuses.' [6]

We are witnessing the process of fetishisation of the data produced by bodies. The activities of members of the Quantified Self movement and other lifeloggers who willingly

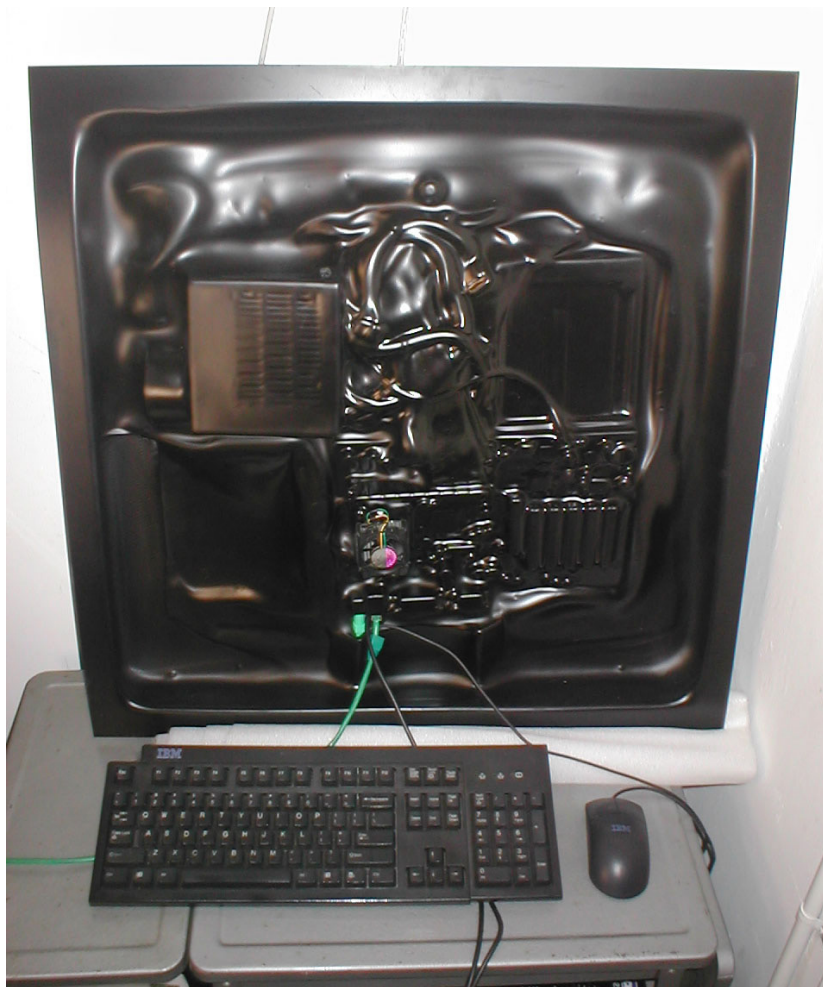


Figure 2. 'Carnivore Server (RSG-CSCPU-2)' by Paul Johnson (2002).

disclose and monitor their lives for the gaze of networks come to mind as examples. These users might not be aware of the destinations to which their data travels, the places it is stored, and its accessibility to unknown parties, but they accept such a state of things either because they trust their service providers and platform developers or because they do not see another way of maintaining their personal and professional relations in the connected world. Although the majority of users never raise concerns or think about the degree of exposure involved, one can notice a subtle but growing awareness of the 'data cocoon' we produce with our tools. I am interested in how we come to terms with the realisation of being involved in involuntary self-monitoring, how we negotiate the conditions, how we resist or... enjoy it.

Speaking of apps, they engage with the body's pulsations, vibrations and movement. The body as organism is not of interest any longer, but the body-across-platforms as the body with and as the data it produces. In the end of your essay on apps, Patricia, you ask, 'How

to intervene and experiment with the relations that the app can have and thereby become a something else of itself? What does it take to do this?' (Clough, 2014b: 46). Could you address this question by contextualising it within your own background and also by making connections with your recent work on 'the datalogical turn' and your reading of the body as inextricable from measuring apparatuses?

Patricia Ticineto Clough: Before I got a Ph.D. in sociology, I studied at the Biological Computer Lab at a time, the mid seventies, when second order cybernetics was being elaborated there, with Heinz von Foerster, Humberto Maturana, Gordon Pask and Herbert Brun all contributing. For me, the computer always has been the biological computer and the relationship between human and machine always has been more about the body than about artificial intelligence, even if AI at first won the day. But now when it is more common to think of digital bodies, or bodies as/of data, and calculation as affective, it is important to rethink the body beyond the body as organism, or the autopoietic body. When Maturana theorised autopoiesis during my time at BCL, he was responding to the then relatively recent discovery of DNA and the genetic code. Autopoiesis was conceived as a refusal of the direct affectiveness of the gene or an environmental input; instead the organism is affected as a whole; in its relations the organism selects for its autopoiesis, or its reproduction as a whole with the aim of homeostasis and equilibrium. As such, the organism, it was argued, is closed organisationally to information and open to energy such that the organism reproduces its boundary when it is affected. In other words, the organism is a self-organising biophysicality. While autopoiesis ushered in second order cybernetics, recognising the self-organisation of biophysical indeterminacy, autopoiesis nonetheless is a systems theory. A certain relationship between parts and wholes is presumed, as the whole is constituted by the functional interaction of parts even as higher levels of order are reached as the organism's encounters bring it to the edge of order in far-from-equilibrium conditions.

Measure is more sophisticated than in first order cybernetics as the observer is central to second order cybernetics, especially in terms of emergence at the edge of order, when boundaries are more a confusion of inside and outside. Yet indeterminacy is still a matter of the biophysical and not of the measure itself, not of the algorithm itself. But today, as algorithms are comprised of incompressible parts or incomputable probabilities that can be bigger than the whole and can at some point or at any point deracinate the whole, systems theory is challenged, as is the autopoietic organism as the figure of life. In algorithmic architectures where calculation is conditioned by incomputable quantities of thought and affect, calculation becomes what Luciana Parisi describes as a matter of speculative reason. This means that the algorithm is itself a spatiotemporal object and the indeterminacy immanent to it is only quasi-mathematical. (Here Parisi draws on Graham Harman's work while drawing his work towards the quantitative). Without going into detail

about Harman's object oriented ontology, it allows for an understanding of the dynamics of measure, the indeterminate quantities conditioning each calculation. The algorithm is a real object in Harman's terms but in Parisi's terms, differing with Harman, the algorithm is a real object infected with the incomputable; the object is incomplete and thus open to relations. My own insistence that the organism is only a special case, a specific figure of life and that the more general case is informational matter or self-measuring matter (2007) might even be revised with Parisi's conception of the algorithm as 'a spatiotemporal matrix of the present' (2013: 36), suggesting a very different materialism than the new materialisms, if a return to materialism is right at all. More important is that there is a rethinking of temporality and the present.

I take this position in contrast to Karen Barad's position. While I much appreciate Barad's attention to measure, I would argue that the indeterminacy immanent to the algorithm is occluded in Barad's conception of intra-action. Ontologically speaking, objects not only are self-measuring, they are algorithmic. Real but neither purely mathematical nor physical, the algorithm's quantities, like the object's qualities, relate aesthetically. This move to the speculative and the aesthetic means the dimension of relation or contact is not a matter of epistemology, cognition or recognition, privileged as these are in autopoietic systems and in Barad's ontology as well. As for the body then, the indeterminacy of the algorithm gives us a new frame with which to engage critically the technologies that are capturing bodily senses and sensation while making bodies more inspect-able and survey-able, breaking down the 'boundary between inner and outer knowledge and control of the body,' as Brian Rotman (Rotman, 2008: 133), among so many others, say. But, the incomputable probability of the algorithm gives us a frame that is not about knowledge or control through knowledge. And to respond politically, we must start somewhere else than knowledge and control. We might consider rethinking media beyond media to mediation and to its immanence to the algorithm object. I believe Alex's work on mediation can be taken in this direction.

Alexander R. Galloway: As Patricia notes, cybernetics is at the heart of this historical transformation. Cybernetics describes networks of actors (whether living or non-living, natural or synthetic) who are able to express themselves, and who likewise can receive and respond to the expressions of others. Cybernetics thus describes an affective network, a network of affective expression and affective response. In many ways this is a good thing. Consider the alliance struck between feminism and cybernetics, in everyone from Ursula Le Guin and the VNS Matrix, to Donna Haraway and Sadie Plant. If patriarchy is one of the 'deep' psychic structures (proliferating injustice by leveraging difference and hierarchy), then shouldn't the more equitable 'shallow' affective networks help do away with patriarchy? If the essentialism of concepts like 'nature' and 'natural feeling' are harmful to women, shouldn't an anti-essentialist feeling (viz. affect) provide some hope?

Affect is a curious topic, partly because the critical commentary seems to contradict itself. On the one hand, Fredric Jameson chronicled what he called the ‘waning of affect’ under postmodernity (Jameson, 1991: 10–11). For him deep psychological structures have given way to more surface phenomena like irony and cynicism. Yet at the same time affect seems to be on the rise today. Deleuze and Guattari famously charted the liberation of affect. Social media proliferate with people’s feelings and desires. Books and conferences are devoted to the subject. So who is right? Can both of these claims be true? Is affect on the wane, or is it on the rise?

Upon further examination the apparent contradiction dissolves. When Jameson says affect he really means emotion or feeling. He means the purely sincere affect of the romantic, Enlightenment ego. When Deleuzians say affect they mean affect proper, that is, affect as the postmodern replacement for modern sentiment. Modern subjects have sentiments, while postmodern subjects have affects. Thus Jameson’s ‘waning of...’ and the Deleuzian ‘turn to...’ are precisely the same historical phenomenon. Modern sentiment succeeded too well, you might say – so much so that, even after disappearing, it has re-emerged everywhere, only now in simulated form.

Cybernetics is most interesting when combating those deeply entrenched structures of injustice. Yet at the same time cybernetics has ushered in a new era of informatic legibility and monitoring. Perhaps today we are no longer ruled by the Father or the Prince. If so, we are ruled instead by the packet, the data point, the unit of legible meaning. We have a new semiotarchy to replace the old patriarchy, a new fiat of information to replace the old fiat of the Father. (I’m exaggerating of course: patriarchy is still alive and well the world over!) This is why I see Patricia’s work on self-measurement to be so useful. How are we to survive in a world driven by the rule of information?

Patricia: I like the implications of Alex’s remarks: to think affect in relationship to first-order and second-order cybernetics and then to recognise affect as a replacement for modern sentiment. As such affect becomes a capacity in the Deleuzian sense which now has been deployed in the deconstruction of entrenched structures of injustice, feminism not merely an example here but a prime example, leading however to the exploitation of affect in so many ways and to a dark Deleuzianism, as Alex has called it. My first remarks about the algorithm are meant to consider that we are post-cybernetics, after affect, when criticism is up against the packet, the data point, the algorithm.

Svitlana: Alex, I think your mention of cybernetics’ ambiguity is important. Perhaps, such ambiguity is not unrelated to common generalisations about cybernetics. Could we dwell

on this for a moment and ask the following questions, ‘what cybernetics?’, ‘first-order cybernetics or second-order cybernetics?’, ‘Wiener’s cybernetics, cybernetics of the Macy conferences or that of the Biological Computer Lab?’, ‘what does it have say about agency?’, ‘how do we distinguish, if at all, between control and regulation?’ and so on. In the end, how important is it to be asking these questions when we apply cybernetic notions for understanding the mechanisms of the ‘world driven by the rule of information,’ where a phone has earned a status of ‘wearable electronics’?

Alexander: The most common shortcoming I find when reading about cybernetics is the lack of historicisation evident in so many authors. The old mantra “always historicise” has fallen away, replaced today by the new mantra “always connect.” And along the way our ability to think historically about the industrial infrastructure has collapsed. (Incidentally this is one reason why Katherine Hayles’ book on cybernetics, *How We Became Posthuman*, is so good, because she explicitly historicises the movement.) The collapse is no coincidence, however, because cybernetic thinking was conceived as a solution to the kind of historical thinking so associated with the ‘age of ideology’, capitalism versus communism and so on. And so it’s common today to find the same authors laud both cybernetic thinking and anti-critical or post-hermeneutic thinking. In some respects, they are simply the same gesture.

Still the ultimate irony lies in how thoroughly cybernetics (and network thinking in general) has incorporated the historical or critical mode, so much so that concepts like difference, alterity, or multiplicity are thoroughly embedded into the very architecture of cybernetic thinking. What formed the basis of the liberation struggles during my parent’s generation is now the bedrock of the most highly capitalised companies on the planet. We are left, then, to reinvent a new set of critical strategies better suited for the world in which we live now.

Svitlana: That leads to my next question about governance or management conducted through the organisational principle of blackboxing and, by extension, the tactics of obfuscation and compression. Could you place apps in the context of the discussions you both initiated in your work, i.e. Alex’s writing on control after decentralisation and, most recently, on the cybernetic hypothesis and Patricia’s work on governance and measure of life, death and matter. In particular, I quote Patricia’s reference to Alex’s reading of the notion of “black box”: ‘Galloway’s treatment of blackboxing not only suggests a possible take on the app, albeit a negative one: the path we more and more will choose to interface with and through the Internet, even as the choices bundled (and those excluded) behind any app icon remain relatively opaque’ (Clough, 2014b: 37). Would it be fair to consider apps exemplary of the ‘normatively positive spin on obfuscation,’ as Alex puts it, in the midst of the ‘compulsory visibility’ and total surveillance?

Alexander: Apps complicate the conversation around obfuscation and compression. I'm thinking of the way in which today's apps and tablet computers obfuscate the machine even more than the GUI interfaces of a decade or two ago, which themselves are driven by high levels of metaphor and artifice. I see obfuscation as simply a common ingredient in all technical systems. Computer science confirms this. The 'obfuscation of code' is a common technique in computer science used to segment and simplify how code modules talk to each other. There is nothing nefarious about it.

Critical theory tends to vilify obfuscation, of course, and for good reason. If the various structures and apparatuses of this life obscure and naturalise power, then it is our duty to demystify them using critique. One might call this an anti-Baroque strategy. The Baroque is an aesthetic of over-saturation. It tends toward the accentuation of an action into a repeatable manner. Thus the very gratifying immediacy of the Baroque at the same time performs an obfuscating function: we don't know the Baroque subject precisely because he is so adept at telling us what he is. Critique, by contrast, aims to undo such structures wherever they are found, and for this reason runs contrary to the structuring tendencies of obfuscation.

Opacity and compression are different though, partially because they are responding to a different historical condition. Today we're grappling not only with the Big Other or the Father, but the NSA and Gmail. The strategies of visibility commonly associated with the new social movements of the 1960s – speak out, express yourself, liberate your desire, come out of the shadows, take back the streets – must be reconsidered today. This is not because such strategies failed, on the contrary these social movements succeeded in various ways, and as such their techniques were brazenly co-opted by the capitalist infrastructure. Large corporations now openly laud diversity in human resources; Nancy Fraser and others have shown how the goals of the feminist movement are now sewn into post-Fordism; Web 2.0 is thoroughly Deleuzian, and so on.

All of these old '60s tactics have been tremendously useful. Yet I wonder if the world isn't a different place today. I'm not sure I want to 'express myself' if I know the Gmail app is listening. We've operated for many years under the assumption that phenomenology was basically correct, that truth is the thing that reveals itself to a solicitous subject. So here my concerns are essentially industrial. If big business has assumed the role of this 'solicitous subject' and now we are all the many data points revealed to it as a kind of 'truth' – a monetary truth to be sure – then perhaps a dose of obfuscation is in order. A cryptographic universe is much more appealing today than an enlightened one.

Patricia: Not only do I agree with Alex about the ‘obfuscation of code’ and that in the face of ‘the commodification of potentiality or inventiveness’, the black box/app is not to be critically engaged either with a hermeneutic approach or a Deleuzian approach to difference or multiplicity. But more, with Alex, I think that what is indicated is the need for criticism to shift its focus to the conceptualisation of the system and the interimplication of cybernetics and the social sciences, sociology especially. It is the conceptualisation of system that in the post World War II years linked sociology and cybernetics. It also underwrote sociology’s unconscious drive to positivism, empiricism, and scientism expressed in the circular functionality of the opposition of qualitative and quantitative methods. That is to say, the circuit between these opposed methods functioned to link phenomenology, or the epistemology of the conscious human knower to probability measures of statistically described populations that made it increasingly plausible to assume that social practices and human behaviour really were patterned and repeatable... and therefore were predictable irrespective of the historical conditions (Steinmetz, 2005). If the historical, in all its contingency and uncertainty, was not the reference for the probabilities of the human behaviour of statistical populations, it was because the historical was displaced by that more powerful conceptualisation of “system” as interdependent parts that function autopoietically to reproduce the whole. So rather than an anti-Baroque strategy or only that, what I think is needed is to see the way cybernetics has been realised in the forms and styles of presenting data in sociological writing and to consider what Matthew Fuller and Andrew Goffey call the grey zone or grey media: both the networks of our sociotechnical infrastructure and the sociotechnical sensibility with which actants act within these infrastructural networks. Thus enlarging our view of media studies to include stratagems from administration to data gathering and dissemination, not simply mass media nor social media. This is a version of the immanence of mediation to the algorithm as a spatiotemporal matrix of the present. This is where criticism is needed and the workings of the algorithm made manipulable for other purposes than mere expression, sincere expression, as Alex puts it.

Svitlana: Regarding the ideology of the aesthetic, can we read such things as ‘persistence of visual knowledge’ (Chun), ‘calculative aesthetic’ (Clough) or ‘beautiful evidences’ (Tufte) as the productions of not just one, but all three modes of mediation, the hermeneutic middle of representation and exchange, the iridescent middle of immediacy and immanence and the infuriated middle of multiplicity and extinction?

Speaking of the body, we see the three middles working in concert when Aphrodite enters the final scene of Alex’s essay ‘Love of the Middle.’ As you explain, it is because ‘the governor of the middle... present at the physical communication of bodies in congress,’ Aphrodite, ‘returns us to a more somatic immediacy’ (Galloway, 2014: 64). If it is not ‘the body-across-platforms’, is it ‘the body-across-the-modes-of-mediation’? Are they different

bodies? Could you speak more of such somatic immediacy in ‘the middle of the middle’ and in the time when media have become so good at erasing the traces of their presence? In your opinion, do apps – the ‘tender buttons’ on our screens that respond to a touch – make us more aware of the presence of the interface?

Alexander: The advent of distributed systems places certain demands on both thinking and practice. I’ve tried to pursue this in various ways over the years, whether it be working on software projects, or doing more traditional research and writing. If there is one continuous thread through my own trajectory it would have to be the something like ‘the politics of code.’ I’m interested in how technical systems both facilitate and prohibit certain kinds of political consciousness. So my first book, *Protocol*, analysed the structure of organisation in distributed networks, particularly those facilitated by the various Internet protocols that have been drafted and deployed over the last several decades. And today with my recent book *Laruelle: Against the Digital*, while the subject matter has changed dramatically, some of the basic questions remain the same. What sorts of worlds are made possible by digitality? What does digitality prohibit? And how is it possible to think non-digitally? (Which is perhaps the most interesting question of them all.)

With the advent of distributed infrastructures, we are obligated to think critically about the middle as such, ‘in-betweenness’ as such. Deleuze and Guattari’s rhizome provides a fitting example: the rhizome is not simply an alternative way of organising leaves, stems, and roots; the rhizome is the middle part and only the middle part. The milieu takes over. Entities, objects, agents, authors – these are all rendered meaningless from the perspective of the rhizome. Today we are faced with a different set of concerns: relationality, systematicity, mediation. Of course Google and Facebook have mastered this better than anyone else. They are perfect instances of rhizomatic capitalism. Thus as critical thinkers I maintain that we must unabashedly profess our ‘love of the middle’ if we are ever able to gain any perspective on this new ‘infrastructural turn.’ The middle is where it’s at.

Western culture tends to alternate between two common conceptions of media and communication, one hermeneutic and the other iridescent. Distributed systems are often excluded from the story. My contribution in *Excommunication* is a simple one: additional modes of mediation exist that are equally deserving of our attention, chief among them being distributed networks. We need a robust theory of networks. We can’t assume they are natural – or worse, exceptional.

Patricia: I am quite intrigued by Alex’s recent tri-part categorization of ‘the love of the middle,’ giving media and mediation three organising figures, Hermes, Iris and the Furies.

For Alex, the last, the Furies, mark an annihilation of hermeneutics and phenomenology as approaches to or forms of mediation. Neither for immanence nor depth, presence nor difference, the Furies are anti-media, as media are displaced by a ‘microphysics of links and vectors,’ a network or what Alex refers to as a system. As he sees it, we, those of us interested in critique, are up against not the system of the 1960’s but a systematicity that undoes any attempt ‘to establish a grand arc of history.’ The implications, he proposes, are a matter of aesthetics, a post-Fordist digital or information aesthetics that shifts between 0 and 1, that is, aesthetics as nothing (data has no visual form) or aesthetics as one (data always has the same form, the information network). In his remarks here Alex extends this view to offer what he calls the anti-Baroque strategy of critique that runs contrary to ‘the structuring tendencies of obfuscation.’ This phrase ‘structuring tendencies of obfuscation’ can be read in terms of cybernetics, where noise is recognised as the condition of possibility of information – a structuring/destructuring/restructuring, aimed at reproducing a system.

Here Alex’s concern with aesthetics is reflective of his disciplinary background in literary criticism but surely any one of us following the recent turn to ontology and an object orientation in philosophy knows there has been a general return to aesthetics but as a matter of causality resonant with a turn to non-consciousness (Shaviri, 2009) as well as a non- or in-human unconsciousness as in Catherine Malabou’s work on the ‘cerebral unconscious’ (Malabou, 2012). For me, with a different disciplinary background than Alex’s, mine sociology, the return to aesthetics, I would suggest, shifts the focus of criticism from textuality/information to data/information. Or to put it otherwise, the recent turn profoundly challenges the styles and forms of presenting data, challenged as we are by the perspective of the sciences – the bio, nano, and neuro-sciences – all properly technosciences increasingly inseparable from industry, policy and developments in computer science, digital technology and the algorithms parsing big data.

Alexander: I appreciate your observation about the disciplinary differences between literary theory and sociology. Indeed sociology has always had a special relationship to systems and systematicity, more than other disciplines. And I agree that we have witnessed, over the last decade or two, a transformation in society and culture from a more textual or symbol-oriented social infrastructure toward a more ergodic, practice-oriented, we might even say ‘executable,’ social infrastructure. Science and industry have a special role to play, just as before. Only today we see less focus on the industrialisation of symbolic systems – the cultural industries, subjectivity and interpellation, representation, and so on – and more focus on what Patricia is calling the sciences of life, those industries devoted to the creation and regulation of bodies, organisms, and entities.

Svitlana: Although here we speak about a cybernetic model of control, I wonder if you'd also see a way to think apps and the 'smart infrastructures' of mobile computing in general as an instance of post-cybernetic governance. By this, I mean that it is, as according to Luciana Parisi, no longer interested in establishing the conditions of the present on the basis of the data from the past; rather, it is driven towards the future but not with the goal of predicting it, but with the goal of generating the very conditions of the future?

If I am correct, it is what Patricia describes as 'the commodification of potentiality or inventiveness' that indicates 'a turn in mathematic technology to the use of indeterminacy in calculation itself, such that calculation increasingly is motivated by uncomputable data internal to the algorithm' (Clough, 2014b: 46). Would this be the case, Alex, that you would define as "excommunication", although such that it comes after the cybernetic dichotomy of information and noise and the metaphysical dichotomy of presence and absence (Galloway, et al., 2014: 16)?

Patricia: What recently my coauthors and I have called the 'datalogical turn' (Clough, et al., 2014) is meant to point to how the algorithms that parse big data are an intensification of sociology's unconscious drive. While there is, as Alex has pointed out, a post-fordist liberal attitude to the array of methods permitted in the humanities, 'such liberalism nevertheless simultaneously enshrines the law of positivistic efficiency...' (Galloway, 2014: 109). Even more so in sociology where its unconscious drive to empiricism, positivism and scientism remains and continues to discipline the forms of writing and presenting data. And yet, big data also is outflanking sociological methods of calculation as well as methods of data collection and circulation, both quantitative and qualitative. This, 'the crisis of empirical sociology,' as Mike Savage and Roger Burrows (2007) have described it, does not merely challenge sociologists to learn new methods of calculation and data presentation, although sociologists are fast trying to do so. The crisis is more profound in that the join of phenomenology and statistical populations is coming apart. In their treatment of big data, Bruno Latour and his colleagues have argued that many of the conceptual assumptions of social theory are undergoing change: "Specific" and "general", "individual" and "collective", "actor" and "system" are not essential realities but provisional terms... a consequence of the type of technology used for navigating inside datasets' (Latour et al., 2012: 2).

My co-authors and I have argued that the datalogical turn points to a different technology for navigating datasets where rather than moving from particular to whole, the movement is from particular to particular. It is the technology of post-probabilistic calculations or measure, the use of quantities that are conditioned by their own indeterminacies, not by human participation (see: Parisi, 2013). As the datalogical turn is a turn that undoes a

criticism fully dependent on Deleuze and Whitehead, it allows for the possibility of drawing out the link between post-probabilistic measure in the algorithms parsing big data and the social logic of today's derivative economy (Ayache, 2007; Martin, 2013). It also allows for a consideration of the implications of the derivative for the conceptualisation of system, noting Randy Martin's discussion of the way the derivative disassembles and bundles attributes, undoing the system metaphysic that takes the 'relation of parts to whole as known beforehand and that each retains its integrity, which fixes its position, interest, and contribution' (2013). The derivative undoes this fixity, turning 'the *contestability* of fundamental value into a tradable commodity – a market benchmark for unknowable value': an incomputable value that is nonetheless deployed in measure (2013: 91). The datalogical turn then carries out the unlinking of the human subject's phenomenological perspective and statistically described populations from the current modes of a calculation that no longer needs to reference system and its assumptions.

We might consider then that the system, or systematics, indeed, the app, must be critiqued from this perspective, a move from assemblage to derivative and perhaps a move from control society and preemption to the algorithm as a spatiotemporal matrix of the present. Control no longer is to be understood as the calculation of a future by means of prediction, nor the calculation of the unknown through pre-set probabilities in a preemption of the future. Instead post-probabilistic measures extend the present, a present that we cannot escape, a present to which consciousness is an after effect. Or as Mark Hansen puts it, we are dealing with a 'consciousness ... generated after-the-fact, as an emergence generated through the feeding forward of technically-gathered data concerning antecedent microtemporal events' (2013). What Hansen calls 'the operational present of technology' is the focus of a post-cybernetic governance of an economy after affect.

Alexander: Parisi is invested in the ideas of randomness and incomputable data. In *Contagious Architecture*, she speaks of patternless data, the entropic, chaos, contingencies, indefiniteness, and change. For her the incompressible virtual already exists within the actuality of the real. I see the argument in two steps: (1) algorithms are real and actual; (2) algorithms already include patternlessness, infinity, and incomputability inside themselves. She focuses on cracks, excesses, interference, contingencies, and how they overwhelm seemingly impervious rational systems. I particularly appreciate how she criticises what's called digital philosophy or computationalism (illustrated in the work of someone like Stephen Wolfram), on the grounds that grid-based cellular automata systems are too fixed and can't account for dynamic change.

Yet ultimately I tend to deviate slightly from some of Parisi's core concerns, for she remains committed to a series of concepts – infinity, the incompressible, and the indeterminable

– that I can't entirely swallow. Whitehead and Deleuze are very strong in Parisi. I sympathise with that tradition, most certainly. But as a Marxist I'm drawn eventually to an inverted set of concepts: finitude and determination, certainly, but also compression.

At the same time these different approaches are not necessarily incompatible. So while Marxists talk about 'determination by the material base,' Parisi speaks rather of the indeterminable as a way to escape the fetters of ossified structure. Likewise when Marx eschews the absolute infinities of transcendental philosophy in favour of the particularities of material finitude, Parisi speaks rather of infinity as a kind of radical virtuality, ensuring a limitless space of possibility.

I'm reminded of Kaja Silverman's wonderful meditation on finitude offered at the outset of *Flesh of My Flesh*, her recent book devoted to the topic of analogy: 'Finitude is the most capacious and enabling of the attributes we share with others, because unlike the particular way in which each of us looks, thinks, walks, and speaks, that connects us to a few other beings, [finitude] connects us to every other being' (Silverman, 2009: 4).

Patricia: If I may have one last word in response to the reference to Kaja Silverman that is meant to honour it and redo it and this is to remember that digital technology has returned us to thinking again about mathematics and computing machines. These take us back to the insights of mathematicians who propose that there are many infinities. Here the many undoes the opposition of finite and infinite and refuses to let us assume something connects us to all beings or all beings to each other. Of course, I could be wrong.

Biographical Notes

Svitlana Matviyenko is a media scholar. She has a PhD in Critical Theory, Media Theory and Psychoanalysis from the University of Missouri and she is now pursuing her second doctorate at the Centre for the Study of Theory and Criticism at the University of Western Ontario. She writes on psychoanalysis, topology, posthumanism, mobile apps, and networking drive. Her work has been published and forthcoming in *Digital Creativity*, *(Re)-Turn: A Journal of Lacanian Studies*, *Harvard Ukrainian Studies*, *Krytyka* and others. Svitalana curated several experimental dance performances and several art exhibitions at the Ukrainian Institute of America in NYC, Museum I London (Ontario) and other venues. She is a co-editor (with Paul D. Miller) of *The Imaginary App* (MIT, 2014).

Patricia Ticineto Clough is a Professor of Sociology and Women's Studies at Queens College and the Graduate Center, CUNY. She is a social theorist whose work and teaching address the methods of inquiry and the core assumptions of such fields as anthropology and sociology in order to shift the focus towards their disciplinary peripheries where one often discovers the archives of outcast material. Clough's co-edited collections *The Affective Turn* (with Jean Halley) and *Beyond Biopolitics* (with Craig Willse) are evidence of passionate collaborative research conducted with her students and colleagues, offering nuanced discussions on discursive closures, shifts and reconfigurations. Her work outlines the dangers and controversies of 'the political economy of biomediated body' implemented by the 'monitoring of the bodily affect as information' within national and international regulatory policies.

Alexander R. Galloway is an Associate Professor in the Department of Media, Culture, and Communication at New York University. His theoretical trilogy on 'allegories of control' – *Protocol: How Control Exists After Decentralization* (2004), *Gaming: Essays on Algorithmic Culture* (2006) and *The Interface Effect* (2012) – became foundational for Media and Software Studies, where he made an equally important contribution as a programmer and media artist. From 1996 to 2002 Galloway was associated with Rhizome, a New York based new media organisation, where he worked as editor and technical director. He also founded Radical Software Group (RSG), a collective of media artists named after Radical Software magazine, published between 1971 and 1974, which explored the impact of video and television on society, fought for the freedom of information and warned against the dangers of its corporate control.

Notes

[1] Clough, Patricia. 'Feminist Theory, Bodies and Technoscience', *Bringing the Body Back in Humanities and Social Science*. February 24, 2014. CUNY Graduate Center. Available at: <https://vimeo.com/41526429>. See also: Clough, Patricia. 'Bodies: Technoscience and Feminist Theories', in Bryan Turner (ed.) *The Routledge Handbook of the Body* (New York: Routledge, 2012).

[2] Parisi writes in *Contagious Architecture*: 'Just as your smart phone works as a monitor device for tracking your location, which then becomes data used to construct the profile of your movement, so too does the monitoring procedure of smart infrastructure collect data which then become part of the programming of new infrastructural systems. As data are recorded, so they evolve into predictive scenarios aiming not simply at presetting your

movement, but rather at generating its future conditions through the generative interaction of parameters with real-time data. This is how post-cybernetic control operates as a form of parametric design. From this standpoint, the goal of parametric design is deep relationality, the real-time integration of the evolving variables of a built environment in software systems that are able to figure emerging scenarios by responding to or preadapting scripted data' (2013: 105).

[3] <http://www.radicalsoftware.org/e/history.html>.

[4] <http://r-s-g.org/carnivore>.

[5] See Matthew Mirapaul's piece on Galloway's Carnivore 'Cybersnooping for Sounds and Images, Not Suspects', *The New York Times* (October 1, 2001) at <http://www.nytimes.com/2001/10/01/arts/design/01ARTS.html>.

[6] Clough, Patricia. 'Feminist Theory, Bodies and Technoscience'.

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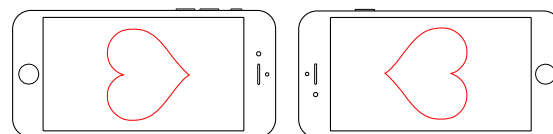
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FCJ-180 Spotify has Added an Event to your Past: (Re)writing the Self through Facebook's Autoposting Apps

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Abstract:

Drawing on in-depth interviews with sixteen Facebook users, this paper presents a series of vignettes that explore cross-platform Facebook apps as 'tools' for self-writing, self-expression and identity performance. The paper argues that the capacity of apps to write in the user's stead – at times without the user's knowledge or explicit consent – works to intervene in and on occasion disrupt users' staged self-performances to their 'invisible audience' (Sauter, 2013) on Facebook. Furthermore, if such instances of automated self-writing are treated as performative, apps hold the constitutional capacity to actively rewrite, regulate and even constitute the self to suit the logic of the 'like economy' (Gelitz and Helmond, 2013), in ways that transcend the boundaries of Facebook.

'The film you quote. The songs you have on repeat. The activities you love. Now there's a new class of social apps that let you express who you are through all the things you do' (Facebook, 2014).

Introduction: Performing the Self in the 'Like' Economy

Facebook's apps network – an 'ecosystem' designed to 'deeply integrate' (Zuckerberg, 2011) commercial lifestyle, gaming, entertainment and shopping applications into Facebook – is a key component of Facebook Inc.'s current operational and economic infrastructure. As Mark Zuckerberg repeatedly emphasised during the 2014 F8 conference keynote, Facebook apps play an essential role in Facebook Inc.'s newest expansion strategy – that is, to become a 'cross-platform platform' (Zuckerberg et al., 2014) that connects not just friends, family and acquaintances but the millions of platforms, websites, 'stacks' and services that currently constitute the web. To date, the external products and services that apps integrate into Facebook include (but are not limited to) games, movie, book and music services, ticket purchasing programs, bookmarking software, photo editors, health and fitness trackers, events managers, comic strip creators, lifestyle forums, interactive cook books and stress relief programs – there are over seven million apps currently available on Facebook (Stasticbrain, 2014), which generate an income of around \$3 billion for Facebook and its third party associates (Zuckerberg et al., 2014).

As such, Zuckerberg's ambition to become the 'platform of platforms' extends beyond mere rhetoric – Facebook already underpins a new form of socio-economic connectivity that constitutes what Gerlitz and Helmond call the new "'like" economy' (2013), that is, a cross-platform, socio-technical 'infrastructure that allows the exchange of data, traffic, affects, connections, and of course money' (2013: 1353). Though Gerlitz and Helmond cite Facebook's 'like' and 'share' buttons as the primary nodes of mediation in this developing 'social web', apps also play a crucial role in connecting this complex socio-technical infrastructure. As Fagerjord notes, apps – once known as applications – no longer simply function as 'software designed to do a specific task' (2012: 2), they are now also utilised as profitable, 'sticky' and frictionless bridges, used to carry massive amounts of data produced and consumed by users between 'integrated, monopolistic outlets' (2012: 4) such as Facebook.

Facebook apps, however, were not simply designed to situate Facebook as the 'cross-platform platform' – they were also apparently created to facilitate and enhance new modes of user self-expression. Rolled out in 2011 along with Timeline, Facebook's newest

profile manifestation, apps were pitched to users as 'the perfect way to express who you are' (Zuckerberg, 2011). As the introductory quote of this paper emphatically suggests, apps are discursively framed by Facebook as tools that let users articulate – and more importantly publicise – 'who they are' by accommodating any user lifestyle preference, 'interest token' (Liu, 2008), socio-cultural taste, consumer choice or even affect; 'your runs, your bike rides, your cooking, your eating, your sleeping, *your happiness*, your fashion, anything you want' (Zuckerberg, 2011, my emphasis).

Facebook's predictably lofty promises to enhance user self-expression should of course be critically scrutinised – there are a number of economic, techno-architectural and socio-cultural implications that call Facebook's claims in to question, as this paper will explore. However, the capacity of social networks sites (SNSs) such as Facebook to accommodate and maintain *some* form of selfhood is well-established – critiques of how individuals construct, negotiate and perform online identity have existed for many decades. As scholars such as J Sage Elwell (2014) Rob Cover (2012) and Theresa Sauter (2013) note, as the web becomes a pervasive and ubiquitous presence in individuals' everyday lives, the distinction between 'online' and 'offline' self-performance is becoming increasingly unhelpful; 'day-to-day processes of self-formation are becoming more and more implicated with new digital tools' (Sauter, 2013: 2). Furthermore, these digital tools are increasingly underpinned by what Tarleton Gillespie calls 'algorithmic logic' – that is, a socio-technical rationale enacted, governed and maintained by both human and computational actors (2014). This paper considers Facebook apps as one such automated 'tool' – and potential algorithmic actor – in the writing of the self in everyday life.

As scholars such as Sauter (2013) note, a plethora of potential 'technologies of the self' – to use Foucault's (1994) much-mobilised term – are embedded in the operational structure of Facebook: status updates, videos, photos, sharing links, location tagging and 'likes' (amongst other functions) all have the potential to facilitate facets of user self-expression. As I shall further explore, Facebook's cross-platform apps can also be considered to be one such 'technology of the self', since they carry a unique set of parameters as tools for self-writing through their automated operational protocols and capacity to connect across platforms. For example, many Facebook apps have the ability to post automatically published status updates (herein referred to as 'autoposts') to an individual's Facebook friends network, often without their knowledge or immediate consent (at the time of posting). Autoposts by apps can take on a number of forms, but most refer to an in-app action or achievement by a user and are written on behalf of a user in first or third person; for example, 'xxx xxxx is listening to Serious Time by Mungo's Hi Fi on on Spotify', 'Batman & The Flash: Hero Run - I've just scored 22, 323 points!' or 'I've just run 5.99 miles on MapMyRun' (see Figure. 1).



[Figure 1 here] Figure 1. Examples of autoposting from Facebook (2014).

The ability of apps to algorithmically write in the user's stead, as well as connect across platforms, gives rise to a host of fresh critical implications in regards to app use as a way 'to express who you are': what does it mean to use apps as tools for self-expression? If, as Cover proposes, 'the establishment and maintenance of a profile is not a representation or biography but performative acts, which constitute the self and stabilise it over time' (2008: 181), then what does it mean to have an app algorithmically perform an act of selfhood as part of users' Facebook profiles? [1] What does it mean for an app to automatically yet unintentionally give away our 'guilty pleasures' to our online audiences – our 'trashy' song preference or our pornographic pleasures? What kind of self can be constituted under 'the logic of the algorithm', as well as through the social connectivity that currently pervades the web?

Drawing on the accounts of sixteen Facebook users, this paper explores the performative implications of apps as tools for self-expression. These vignettes are primarily structured around participant experiences of largely unwanted autoposts by apps and also examine participant strategies of 'coping', resisting or exploiting the connection between their apps and Facebook accounts. Finally, the paper explores the impact that autoposts have on how they view *other* people in their networks. As I will further explore, participants recounted a number of complex, tense and often unwilling encounters with autoposting apps on Facebook – including apps disclosing 'guilty pleasures' such as trashy songs or sexually suggestive content to participants' Facebook friends, Spotify 'adding an event' to a participant's 'past' and the framing of other people's game app posts and invites as 'chavvy'.

Participants' accounts suggest that in many instances, autoposts by apps work to intervene and at times disrupt the carefully staged identity performances that users commonly enact on Facebook (Van Dijck, 2013). By considering critical notions such as 'context collapse' (boyd and Marwick, 2011), 'taste performance' (Liu, 2008) and 'grammars of action' (Agre, 1994), I will argue that apps function not just as *tools* for self-expression, but as unwanted *actors* in the writing and performing of selfhoods on Facebook. If utterances of selfhood on Facebook are performative, then apps hold the constitutional capacity to restrict and even regulate the self in ways that transcend the boundaries of Facebook.

Facebook Apps as Tools for Self Performance

Since the popular emergence of computer mediated communication (CMC) technologies, notions of what it means to express selfhood or identity online have been explored, celebrated and berated by a huge number of scholars (Sauter, 2013: 3). As media theorists such as Frances Dyson have noted, the early internet was popularly perceived as 'a medium that dissolves race, class and gender, producing instead "liquid" identities' (2005: 86). Despite these hopes, the contemporary web that most users experience is not populated by 'liquid' identities or multiple subjectivities – as Marwick (2013), van Zoonen (2013), Karppi (2012) and van Dijck (2013) note, SNS sites are predominantly populated by very much identifiable individuals who are expected, as Mark Zuckerberg famously claimed, 'to have one identity' (cited in Van Dijck, 2013). As Marwick notes, though 'the move to commercial social software such as social network sites, blogs, and media-sharing services has brought with it an impetus to adhere to a fixed, single identity' (2013: 368), this commercial impetus does not fit how most individuals experience identity formation and construction in everyday life. Similarly, Van Dijck states:

The mantra of people having one authentic or 'true' identity... betrays a fundamental misjudgement of people's everyday behaviour. Ever since Goffman, it is commonly accepted that people put on their daily lives as staged performances where they deliberately use the differentiation between private and public discursive acts to shape their identity. (2013: 212)

Despite these assertions that identity construction consists of a 'staged performance' rather than a single or 'authentic' identity, Facebook insists that their tools – such as apps – can assist users in 'expressing who they *are', *implying that users do not 'perform' their identity on Facebook; they are *the selves they portray on Facebook*. Participants' testimonies suggest that this is far from the case, as I will further explore, yet Facebook's discursive construction of identity suggests that a users' single, verifiable self can indeed should be expressed via their Facebook use.

The commercial benefits for the harvesting of users' profile information are sizeable. As Karppi (2012) notes, this data can be efficiently translated into monetary value through targeted advertising, behavioural marketing and other personalisation strategies. However, such information does not just generate profit for Facebook and its associates, it also holds expressive and affective value for users; as Liu recognises SNS profiles constitute for users 'an expressive arena for taste performance' (2007: 252). Yet though Facebook and its advocates celebrate the input of this information as beneficial to user self-expression,

scholars such as Marwick, Cover, Karppi, John Killoran (2002) and Laron Janier (2010) note that Facebook's attempts to determine users' interests can be critiqued as standardising and restrictive. For example Marwick states that:

Facebook profiles cannot be altered and thus all adhere to the look and feel of the site. As a result, user customization is restricted primarily to filling out predefined fields, such as favourite books, music, television and films. (2013: 14)

Such criticisms highlight the homogenising influence of commercial interests on profile pages that work to restrict the modes of self-expression available to users of SNSs. These critics suggest that Facebook's operational architecture may indeed provide a means for users to express elements of their selfhood, but under a technological regime that restricts the construction of identity to normative, regulatory and commercially viable frameworks. Furthermore, Software Studies theorists such as Philip Agre and Kitchin and Dodge have proposed that these computational frameworks could have performative effects for the users that 'act' through them. Agre's 'grammar of action' model proposes that the implementation of computational architectures such as Facebook can 'constitute that reorganization of... existing activity' (1994: 11) suggesting that self-expression can be rearticulated, and therefore regulated, to fit the computational grammar embedded into technological frameworks, networks and interfaces. Through such grammar, as Karppi states, 'impressions of the self are built according to the platform' (2012: 293).

What role then do apps play in these frameworks? Apps have been scrutinised by scholars from a plethora of disciplines for their effect on factors such mental health (Richardson, 2013), familial well-being (Wilson and Yochim, 2013) and identities (Walker, 2014), as well as for their role in 'gamifying' socio-cultural practices such as physical self-improvement techniques (Williamson, 2015) and learning pathways (Fallon, 2013). Though the *content* of various apps has been critiqued through various theoretical frameworks for some time, the form and function of the app in and of itself – as an object or a relation (Clough, 2014) – is a newly-developing consideration, recently explored by scholars such as Manovich (2014), Matviyenko (2014), and Mellamphy and Biswas Mellamphy (2014). This paper seeks to contribute to this developing field of app studies by considering both the content *and* relations that cross-platform apps present to users, specifically in relation to identity performance, as well as through the lived experiences of Facebook apps users. It is Gerlitz and Helmond's emphasis on social-technical relations mobilised by Facebook that makes the 'like economy' a valuable framework for considering that connective capabilities of Facebook apps in relation to self-expression. As the vignettes highlight, it is often the cross-platforms connections created by apps (between Spotify and Facebook,

Instagram and Facebook, Slideshare and Facebook, etc) as well as the autoposted content disclosed by these apps, that problematises the role of apps in self-articulation and identity performance.

Though Gerlitz and Helmond do not explicitly explore apps as tools for identity performance, they argue that the 'like' and 'share' buttons used to connect platforms and services currently afford users a very limited 'horizon of possibility' (2013:1353) that only allows for the expression of positive – rather than negative or critical – sentiment. They speculate that apps might expand this horizon of possibility, as apps facilitate a discursive and expressive framework that extends beyond merely being able to 'like' or 'recommend' something. They note that:

... when creating an app, developers are prompted to define verbs that are shown as user actions and to specify the object on which these actions can be performed. Instead of being confined to 'like' external web content, users can now 'read', 'watch', 'discuss' or perform other actions. (2013: 1353)

Do apps then hold a way out of the restrictive framework that Facebook imposes on its users? The existence of over seven million apps certainly suggest that apps allow users to 'express who they are' by accommodating forms of expressive action that go beyond simply 'liking'. However, Gerlitz and Helmond highlight that 'automatic posts' by apps – that is, the autoposts that take the focus of this paper – may problematise the expressive potentials of apps:

These new apps come with the controversial feature of frictionless sharing and automatically post performed activities to the ticker once users have signed up. (2013: 1353)

The ability of apps to autopost on a user's behalf on friends' Newsfeeds or Tickers [2] certainly has sparked controversy amongst Facebook users. Facebook is now downplaying the significance of autoposts in users' activity, admitting that 'people often feel surprised or confused by stories that are shared without taking an explicit action' (Facebook blog, 2014). These sentiments were certainly echoed by participants. Though many participants enjoyed using apps, experiences involving autoposting were overwhelmingly negative, as I will shortly explore. Furthermore, if the 'performed activities' of apps are considered in the Butlerian sense – that is as a performative act that discursively 'enacts and produces' the subject which it names (1993: 13) – then autoposts take on a far more profound significance

than just being confusing. Apps' performative capacity to algorithmically write utterances of selfhood on behalf* *of users actually works to negate their expressive potential, by (re)writing selfhoods that conform to the socio-technical grammar of the ubiquitously connected 'like' economy.

Method: Investing in the 'Like' Economy

In total, sixteen participants were interviewed as part of this research project, all of whom took part in semi-structured, face-to-face interviews designed to explore participant engagement with apps and services on Facebook. [3] Participants were recruited through the 'Plugged-in Profiles' research page – a Facebook page established and maintained as part of the project. The page was accompanied by a research survey, which some participants filled out prior to their interviews. All participants were assigned pseudonyms in order to protect their identities.

Establishing a Facebook page involved self-reflexively joining the 'like' economy that this project seeks in part to critique. The page gained eighty nine 'likes' (that, is users who have subscribed to the page) and calls for participants were seen by over one thousand Facebook users. However, as Gerlitz and Helmond note, the nature of the 'like' economy is grounded on social connectivity, meaning that many of my subscribers (and subsequent interviewees) were largely recruited from friend networks close to my own pre-existing network on Facebook [4]. As a result, my participants share some socio-cultural similarities in terms of their demographics – for example are all 24–30 years old and based in the UK. It is thus important to note that the accounts of my participants do not reflect the plethora of possible identities or demographics on Facebook. As is clear from the following vignettes, my participants accounts are embedded within socio-cultural normative tastes and practices that are specific to their lived experiences and are therefore contingent on context-specific parameters of taste, class and cultural preference (amongst other factors). Their responses should thus not be taken as representative of Facebook users as a whole. Rather their testimonies are explored here to highlight the ways in which apps intervene in self-performances that are always-already embedded in pre-existing frameworks of socio-cultural and economic norms, negotiations and practices.

Interviews were semi-structured in order to explore participant experiences of Facebook apps, and more specifically participant accounts of autoposting – that is, instances wherein automated status updates were implemented, produced and posted solely by the app on behalf of the user, rather than the participant themselves. As the vignettes highlight,

participant accounts of autoposts were almost wholly negative (with the exception of Marc, featured in vignette four), often due to the fact that though the participant had inadvertently consented to autoposting as part of the Terms and Conditions for using the app, they had not realised that the app had autoposted in the specific instances featured in the vignettes. That is not to suggest that participant engagements with apps in general (also covered as part of the interviews) were wholly negative – many participants enjoyed many benefits of engaging with the apps on their phones and networked devices. However, as the relationship between cross-platform autoposting and self-performance constitutes the primary research focus of this paper, specific encounters with autoposting, rather than experiences with apps in general, have here been afforded the most critical scrutiny.

Who do you think you are? Carefully-crafted identity performance on Facebook

Before focusing on in-depth vignettes that explore how apps affect participants' perceived online identity performances, it is first important to establish how participants constructed and maintained their Facebook personas. After all, if Facebook claims that apps help users 'express who they are', who did my participants think they were? What *kind* of selfhood(s) did my participants seek to articulate through their Facebook profiles?

As Van Dijck recognises, despite Mark Zuckerberg's claim that 'you have one identity', the notion that individuals experience their identities as a single, uniform or coherent selfhood has been long contested. The idea that our Facebook profiles reflect a certain 'type' of staged selfhood – rather than an 'authentic' or 'fixed' self – was reflected in the contributions of many participants. For example, Calum (duty manager, 30) was happy to admit that his Facebook use reflected a 'version' of himself – but an exaggerated version. When asked '*Do you think your Facebook use reflects who you are?*', he replied:

Yes and no – but maybe people see a version of me, a side of me that kind of, meta, hyper, you know, side of me... It reflects an aspect of my identity.

Similarly, Sam (digital communications manager, 29) also suggested that her Facebook use reflected a certain type of self, rather than an 'authentic' identity. Sam seemed well aware that her performance on Facebook constituted what she called a 'constructed public

persona' rather than a 'true' self. [5] She explained what she means by her 'constructed public persona':

So it's how I want the world to see me... so for instance, I've had depression, and you wouldn't know that from what I said on Facebook... you wouldn't know if I was having a really shitty day at work for instance. [My Facebook use] is like me, it's not a completely different person, it is me, but it's not all of me. And it's yeah, it's like my best self (my emphasis).

Sam and Calum reflect Van Dijck's observations that 'users have come to understand the art of online self-presentation and the importance of SNS tools for (professional) *self-promotion*' (2013: 200, original emphasis). That is, in performing a 'best' or 'hyper' self that downplays perceived negative aspects of their personalities, Sam and Calum highlight their awareness that their identity on Facebook is carefully-crafted performance.

Though Van Dijck's assertion that 'users... have become increasingly skilled at playing the game of self-promotion' (213: 210) was echoed in part by some participants, it was clear that for some participants self-presentation on Facebook did not necessarily equate to self-promotion – professional or otherwise. For example, though participants such as Melanie (civil servant, 29), Kevin (accounts executive, 25), Calum and Sara (customer service manager, 29) were acutely aware that they were performing a constructed self, this self was not maintained simply through a desire to perform their 'promoted' or 'ideal' self (Nagy et al. 2011), it was also contingent on an acute awareness of their 'invisible audience' (Sauter, 2013; McLaughlin and Vitak, 2012). 'Invisible audience' here refers to the network of friends, family, acquaintances and even strangers that could *potentially* view their performances of selfhood on Facebook. As Sauter notes, by posting to Facebook users are 'submitting themselves voluntarily to a panoptic form of constant scrutiny' (2013: 12) imposed by this audience. Calum explained that:

I'm quite aware that, because I see friends who post lots of political things like all the time, or petitions all the time and you do become a bit exhausted to see that kind of stuff, um so I don't want to saturate somebody else's Newsfeed with things that I don't really think they're necessarily going to be interested in.

As Calum further states, he was aware that his interest in LGBT politics might not always be welcomed by his Facebook audience:

*I could easily just always go on about LGBT policies when people get bored
'Oh there's Calum going on about the gay shit again and again'.*

Thus, for Calum, posting content to Facebook is not simply about promoting his 'ideal' self, it was also about not 'saturating' his friends' Newsfeeds with content that might not interest them. [6] Similarly, Melanie's controlled performance was also contingent on the eyes of her Facebook network. She states in relation to her Facebook use that, 'it's about being able to be selective and thinking about who your audience is'. Sara also recognised that her Facebook use was affected by the scrutiny of her network – she stated that she only posts content that she deems is acceptable to her network and professional colleagues, saying 'I have to restrict some of my personality I suppose' in relation to the kind of content she posts, and later added that 'I know I shouldn't care what people think of me, but I do'. Calum, Sara and Melanie's accounts suggests here that the performed self on Facebook does not always equate to a 'promoted or 'ideal' self; rather it is a selfhood also constituted through the perceived desires of their invisible audience.

If the enactment of selfhood on Facebook is a carefully considered and staged with an invisible audience in mind, what role do apps play in this performance? As the following vignettes expand upon, the role that apps play in the construction and presentation of selfhood was revealed as complex, tense and often unwanted – apps disrupted and intervened in these performances in ways that call their status as simply instrumental 'tools' (or perhaps 'props' would be a more fitting term) for self-expression very much into question.

Vignette One: Autoposting Apps and the Invisible Audience

As the previous accounts suggest, the performed self on Facebook is enacted under the gaze of 'the sprawling mass of contacts most people amass on Facebook' (Marwick, 2013: 368). Kevin (accounts executive, 25) however, who was interviewed with his housemates Alice (researcher, 28), Rory (sales manager, 30) and Daniel (graphic designer, 29), had such an acute awareness of his 'invisible audience' that his Facebook activity was very limited. Kevin called himself a 'lurker' and explained that:

I never post anything, I never do it... I feel sort of self-conscious. I feel like I don't want other people to think that I'm fishing for likes or if I don't get enough likes I'm like 'oh that was so embarrassing I shouldn't have put that one up' (Kevin laughs).

He explains later in the interview when asked if his Facebook profile reflects 'who he is' that 'I don't think [people] would really, like get very much from my profile, because I don't really contribute much'. Kevin's performance on Facebook is thus very much *restricted* by a consciousness of how others might see him, and is not contingent on any notion of an 'ideal', 'promoted' or 'authentic' self.

Given that Kevin's awareness of his imagined Facebook audience leads to a reluctance to perform at all, how does his interaction with Facebook apps affect this limited self-performance? Along with other participants such as Beth, Sara and Alice, it was Spotify that caused the most contention for Kevin in regards to his apps usage. The Spotify app on Facebook currently boasts over 10 million monthly users and as Facebook's Apps Centre states, by connecting to Spotify via Facebook, a user must agree as part of the Terms of Service to this somewhat ambiguous condition: 'This app may post on your behalf, including songs you listened to, radio stations you listened to *and more*' (Facebook Apps Centre, 2014, my emphasis). Thus, in signing up to Spotify via Facebook, a user's songs ('and more') have the potential to be automatically posted to their friends' via the Newsfeed or ticker. Spotify's current settings allow free-account holders to listen to music as part of either a 'public session' – in which a user's song choices are publicised to Facebook – or a 'private' session – in which songs are not publicised. Perhaps unsurprisingly, listening on a 'public session' is the default option for users connected to Facebook.

Kevin explains that though he is aware that his Spotify and Facebook accounts are connected, he has occasionally forgotten to switch to a 'private session' on Spotify, meaning that his song preferences are then publicised to his Facebook friends' network. The following exchange between Alice and Kevin reveals the consequences of Spotify's autoposting of Kevin's listening choices:

Kevin: If you forget [to switch to a private session on Spotify] then everybody's like watching every song that you're listening to, you could be listening to complete trash (Alice and Kevin laugh) really depending on what it is, it's happened a few times to me, I didn't even realise it was posting, I feel like, loads of people like it one time, like 'what is this?'

Alice: And it's like Dolly Parton

Kevin: Yeah it was Nickleback

Alice: No way – that's so embarrassing!

Here then, Kevin's restricted Facebook performance is undermined by the Spotify app; even though Kevin consciously chooses to limit the amount of content he posts to Facebook, Spotify autoposts the songs he listens to his Facebook network without Kevin's knowledge or consent, at least at the time of posting.

Kevin's issue with these autoposted songs is clearly apparent: the app is publicising songs that Kevin – and Alice – consider to be 'trashy' and 'embarrassing'. Kevin and Alice's sentiments suggest that listening preferences are here considered to be what 'symbolic markers' of identity (Marwick, 2014: 367) or 'interest tokens' that constitute a 'taste statement' (Liu, 2007). As Marwick and Liu note, identity is in part constituted by 'interest tokens' (such as songs) which 'serve as symbolic markers that signal something about who [users] are' (Marwick, 2014). Here then Kevin's music choices are clearly framed as a taste performance that partially signifies 'who he is' (in Kevin and Alice's eyes at least). [7] Crucially however, unlike the symbolic markers of selfhood that Marwick describes, the songs Kevin is listening to on the Spotify app are not consciously 'displayed' by Kevin as markers of taste – they in fact function as *unwanted* markers that are automatically posted by the app, not by Kevin himself. In posting Kevin's potentially 'trashy' or 'embarrassing' listening preferences, the Spotify app is performing a clearly unwanted utterance of selfhood – a moment of intervention into Kevin's Facebook activity, wherein the app is revealed as an powerful, algorithmic 'socio-technical actor' (Gillespie, 2014: 179). In performing an act of self-articulation on Kevin's behalf, Spotify thus reveals a power to actively (re)shape Kevin's intentional representations of identity, rather than functioning simply as a tool for self-expression.

Finally, Kevin's account exposed the role of the 'like' button as a flexible signifier that does not necessarily denote that someone actually 'likes' the content that they have acknowledged. When Daniel later states that he makes sure his Spotify app is set to 'private session' when listening to embarrassing songs, Kevin states:

Kevin: To be brutally honest I've done opposite, I've found a really good song

and turned it off private and then played it to see who would comment (the group laughs) like five times in a row, like 'I've discovered this amazing music'

Interviewer: right and has it ever had the desired effect? Have you ever had any likes or anything?

Kevin: No it only gets likes when it's a terrible song

(Both laugh)

Interviewer: Is that because people actually 'like' it you think?

Kevin: No, no it's because they're ripping the piss, I think, otherwise they're kind of like 'yeah whatever, you found some music, I don't care'.

The fact that Kevin believes that his friends only 'like' songs in order to 'rip the piss' not only highlights the discursive and affective limitations of the 'like' economy that Gerlitz and Helmond identify, it also reveals the complex strategies mobilised by individuals in order to subvert the socio-linguistic architecture imposed by Facebook – according to Kevin, his friends are re-appropriating the 'like' button in order to signify their derision of Kevin's song choices. In using the 'like' button to signify a form of 'dislike' (or at least derision), Kevin's friends reveal what Latour calls 'the risky intermediary pathways' (1999: 40) subjects follow when assigning meaning to referents. In this case, the rigid logic of positive sentiment enforced on users through 'like' button is challenged; the pathway to meaning behind the button is made slippery, playful and ironic.

This is not the only form of subversion evident in this exchange however – in playing an 'amazing' song five times in a row, Kevin attempts to present what he deems to be a publicly acceptable song to his audience. In doing so Kevin is attempting to use the app as a 'tool' to perform a revised selfhood; a self-performance constituted by the public disclosure of 'amazing' rather than 'trashy' songs. Unfortunately for Kevin, his efforts to take back control of his performance falls on deaf ears so to speak – it seems that Kevin's friends only acknowledge his performative slippage of listening to 'terrible' songs in public. Kevin's attempted redirection of Spotify's autoposts exemplifies Gillespie's proposal that algorithmic socio-technical architectures encourage users to 'orient [themselves] towards the means of distribution through which we hope to speak' (2014: 184). He writes of Facebook:

Some [users] may work to be noticed by the algorithm: teens have been known to tag their status updates with unrelated brand names, in the hopes that Facebook will privilege those updates in their friends' feeds... other may work to evade an algorithm. (2014: 184)

Here then Kevin is attempting to be 'noticed' by the Facebook/ Spotify connection in the 'right' kind of way (by listening to the same song five times in a row) – in order to present a socially acceptable form of selfhood, Kevin orients his actions to suit the algorithmic protocols of the two connected apps.

Kevin's account not only reveals the power of apps as 'tools' for self-writing – more specifically for writing the *wrong kind* of public self – they also compliment Elwell's assertion that 'although the way we present ourselves online is often highly crafted... the construction of online identity is likewise often beyond our control' (2013: 238). Kevin's account suggests that 'selfhood is thus a contingent process that is intricately intertwined in complex networks with other actants and entities' (Sauter 2013: 4). The Spotify app is one such actant, one that encourages a form of 'turning to face' the algorithm (Gillespie, 2014: 184) in order to 'correctly' present identity via Facebook.

Vignette Two: Re(writing) and Regulating the Self through Spotify

Like Kevin, Beth (24, teacher, UK) also recounted a number of unwanted autoposts by the Spotify app. She stated as a part of her survey response:

I didn't realise Spotify automatically shared everything [to Facebook]! It was only when someone 'liked' the fact that I added a song to a play list and played a song that I realised. I didn't care too much, despite having a lot of guilty pleasure songs but I generally switch it to a private session now as it just seems unnecessary.

Echoing the exchange between Kevin and Alice, Beth's sentiments suggest here that music choice is a symbolic marker of taste; and by divulging her 'guilty pleasures', Spotify is unwantedly intervening in her taste performance. Furthermore, Beth expressed later that she felt the autoposting of 'guilty pleasure' songs could have an impact on how others see

her on Facebook. She states when asked ‘Do you think the Spotify posts affect how others see you?’ that:

Um I guess so, because... when you're a teenage you get that 'what kind of music do you like?' question all the time, it's a big way to find out if someone's cool or not, but when you're a grown up like people don't really ask so I guess they could see things I'm listening to and be like 'oh they like that' or 'oh they're listening to this' and I guess it will affect the way people see you, but not necessarily in a bad way.

In keeping with Beth's observations that her Facebook use 'reflects the best bits of her personality', the autoposting of 'tacky' songs on to other people's ticker's represents a potential departure from the carefully-crafted selfhood that Beth constructs on Facebook.

Like Kevin's testimony, Beth's account so far highlights the power of apps such as Spotify to intervene in self-performance on Facebook. Yet Beth goes on to emphasise that apps hold even greater potential – not only to disrupt the writing of the self on Facebook but to also regulate and restrict the self* beyond* the boundaries of the site. As Beth explains, the Spotify app currently has a function in which it automatically switches from a 'private' to a 'public' listening session after twenty minutes. She states that:

Half the time on my phone, if I go out and I just have my headphones on if I've left [Spotify] for a bit it goes back to the non-private setting, so um, half the time on my phone I don't do it because I've already started walking and you have to like, I don't know remember how to find [the 'private' setting] or whatever.

The fact that Spotify switches from a 'private' to 'public' session after twenty minutes impedes Beth's capacity to comfortably remain in the realm of private listening, leading to an anxiety that the type of song she is listening to may not be suitable for sharing:

I might be listening to something and then I'm like 'oh I want to listen to something else' and then I'll think, I'll remember I'm online, maybe because I want to listen to something that's a bit more like, I don't know, that I don't want anyone to know about.

Beth explicitly states that this disclosure of her songs choices is unwanted, but she does not know how to stop it; she states: 'I'd rather have it so it's a private setting all the time, but... I don't really know how to do that'. To compensate for this lack of technological know-how, Beth has come up with an alternative solution to avoid the unwanted disclosure of the songs she is not comfortable sharing:

If I listen to a playlist quite often I'll just kind of leave it because then it will just say I've listened to that playlist rather than specific songs.

Beth here then recounts that her Spotify/ Facebook connection has actively led to a restriction of the songs that Beth feels she can listen to while she is listening on her mobile – to avoid the risk of publicising a song 'she doesn't want anyone to know about', Beth will only listen to specific play lists. The Spotify app's connection to Facebook here then works to regulate Beth's listening habits, redirecting Beth's self-performance through an architectural framework that encourages her to adhere to symbolic markers of music taste that she feels are publicly acceptable.

Beth's strategy for coping with Spotify's autoposting capabilities expose the power of apps not just to perform on behalf of the user but actively redirect – and in Beth's case regulate – the kinds of performance that can be enacted in relation to the self. Beth's coping strategies exemplify Agre's 'capture model' of socio-technical organisation; that is, 'the grammar of action' implemented and imposed on users causes the individual 'to *orient their activities* towards the capture machinery and its institutional consequences' (1994: 110). In Beth's case the 'capture machinery' is made up of the algorithmic technologies employed by Facebook and Spotify, and the 'institutional consequences' are the making 'public' (to Beth's Facebook network at least) of music preferences that would otherwise be private. By forcing Beth to orient her activities and regulate her music choice to adhere to a normative ideal of publicly acceptable music, the idea that Spotify helps Beth express 'who she is' is called very much into question. It seems that apps hold the potential to tell users 'who they are', rather than vice versa.

Finally, Beth's negotiations with her Spotify/ Facebook connection were further complicated by another account of autoposting. She explains how a few weeks prior to the interview that Spotify had 'added an event from her past':

[Spotify] sent me this completely random thing that came up on my phone the other day that said um, 'Spotify has added an event from your past', and I was

like 'what is that?' and it was just that I'd listened to this completely random song like, several months ago... it just popped there, and it kind of annoyed me because it didn't ask me if I wanted to put it on there, it just added it on there.

Beth expanded on her reasoning for being annoyed by this unwanted addition to her 'past'. When asked 'was it a song that you were happy to be added?', she explained:

It wasn't one that I minded, no it wasn't like a cheesy, it was just a random album song... I felt a bit indifferent about it, about the song choice, but if felt like [Spotify] was trying to make it significant and it wasn't, because I was just listening to it as part of the album you know, it wasn't like a special thing or anything.

Here then it is not so much the 'tackiness' of the song that registers as annoying for Beth – rather is the fact that an 'insignificant' song in Beth's listening habits has been suddenly and non-consensually demarcated as 'significant' to Beth's 'past'. When asked where she deleted the unwanted autopost, Beth replied:

Well no, because when I actually went on to my page I couldn't see it, but then somebody liked it, so it must've been somewhere but I couldn't find where it was... you know when it shows just [notifications] on the iPhone, but then it wasn't like on my page or on my, it was kind of just an isolated, so I don't know where it is, or if it's still there, I don't really know.

Spotify's utterance of selfhood on Beth's behalf here takes on both an ephemeral *and* archival quality – it has been added but Beth does not know where it is, rendering action against the offending autopost impossible. As Beth states, the song is not an identity marker deemed important enough for her to consider it as 'significant' to her archived selfhood on Facebook, yet Beth in this instance is powerless to become editor of her written historical identity. The limited visibility of such posts is an attribute unique to autoposting, as outlined further in vignette four. Here however it is important to note that Beth's negotiation with her Facebook-Spotify connection thus constitutes a site of struggle between the autonomy of the user and the autonomy of the app – a struggle in which the Spotify app holds the performative power to quite literally rewrite Beth's Facebook history to suit the operational imperatives of Spotify.

Vignette Three: 'You Have One Identity'? Context Collapse Caused by Apps

Not all moments of identity performance slippage via apps exposed a 'guilty pleasure' for participants. For example, Sam (digital communications manager, 29) reported that she had only experienced one instance of autoposting – by an app called Slideshare – a tool for designing and creating professional presentations. Sam explains that:

so it turns out when I upload something to Slideshare [a presentation app] it posts a picture of it on Facebook... that's why I don't like things that autopost, because I don't, I don't really use, I don't use my personal Facebook profile for works things, I use Twitter for it, so my Twitter profile is like my 'work me'.

Sam thus alludes to the fact that her identity performance changes depending on the platform – her Twitter account presents her 'work me', while her Facebook account does not. Furthermore, as Sam herself admitted during the interview, publicising your professional presentations does not necessarily constitute a disclosure of a 'guilty pleasure'; why then was she bothered by this unintended posting of professional content? She explained that:

I think for me I guess it goes back to the like, the persona thing because I don't really talk about work on Facebook... it just didn't really fit with the sort of stuff I do, whereas with Twitter I'd more than happily say, in fact probably will say, this is a presentation that I did because that's where I talk to people about work stuff I do, and I have people who follow me for work stuff.

Thus in this instance the autoposts of Slideshare do not disrupt the boundary between public and private – a boundary crossed in Beth and Kevin's negotiations with Spotify for instance – but instead a boundary between online social contexts. Mark Zuckerberg's claim that 'you have one identity' (a claim Van Dijck seeks to refute) does not apply for Sam – Sam uses different platforms to perform different identities. Sam's sentiments thus exemplify Van Dijck's assertion that: 'each construction of self entails a strategy aimed at *performing* a social act or achieving a particular social goal' (2013: 212).

In disrupting the boundary between Sam's platforms, the Slideshare app's actions epitomise what Marwick and Boyd call 'context collapse' (2008) – this is 'the theory that

social technologies make it difficult to vary self-presentation based on environment or audience' (Marwick, 2014: 368). As Marwick notes, 'people have developed a variety of techniques to handle context collapse' (2014: 368), and in Sam's case this entails having separate Twitter and Facebook accounts that represent different facets of Sam's selfhood. In autoposting symbolic markers of her professional selfhood to the wrong context (that is Facebook rather than Twitter), the Slideshare app brings about a collapse between contexts that Sam has worked hard to avoid.

In creating this context collapse for Sam, the Slideshare app highlights the negative consequences of Facebook's ambition to become a 'cross-platform platform'. That is, in attempting to provide a commercial viable bridge between platforms, Facebook apps also disrupt the context-specific identity performances enacted by users. In doing so, autoposts by apps highlight that users *do not* have one identity that can be 'expressed' across all platforms to all audiences. The function of apps to apparently 'express who you are through all the things you do' thus works to foreclose the possibilities of enacting multiple identities across different platforms. Apps may express* elements* of identity performance, but the ubiquitous connectivity of the 'like' economy works in tension with Sam's desire to enact different performances in different contexts. As such, the cross-platform connectivity of apps may enhance Facebook's scope for commercial development, but in doing so they negate the potential for users to perform multiple selfhoods in exclusive online environments. In Sam's words, 'the apps I choose probably do tell people about me. But I am not my Facebook app permissions'.

Vignette Four: Sexually Suggestive Content and Exploiting the Connectivity of Apps

Kevin, Sam and Beth's engagement with apps and autoposts discussed so far revolves around the apparently innocuous leakage of 'interest tokens' that unintentionally intervene with their self-performance on Facebook and elsewhere. Calum's experiences of apps however involved the disclosure of slightly more sensitive material. Calum explains:

So what happened was, on Instagram you know, I follow all sorts of things, mostly friends but you know sometimes the occasional celebrity who's interesting on Instagram... but in this instance it was a porn star

Calum explains that he was 'liking' (on Instagram) pictures from this porn star, some of

which were sexually suggestive, and in doing so these pictures were appearing as part of his Facebook activity:

of course these [pictures] were coming up on my Newsfeed, which I didn't, which I wouldn't have been made aware of, only for I think another friend had actually liked it on Facebook.

Calum, like Sam, Kevin, Beth and all other participants who had experienced unwanted autoposts, acknowledges that though he may have consented to some form of autoposting as part of the Terms of Service for using the app [8], he was not aware that this particular instance of autoposting was going to occur. As Calum puts it 'I wasn't aware of what [Instagram] was going to be sharing... I understood it more as that if I took pictures and wanted to share them, they would share to Facebook'; it did not occur to him that simply 'liking' a photo on Instagram would trigger an automatic post to Facebook. Calum's experience highlights a subtle but important distinction: though Calum had consented to 'the app posting on his behalf' at the time of installing the app, he felt he had not consented to the specifics of autoposting with which he had subsequently been confronted. As scholars such as Gillespie and McStay have noted, the lack of specific information, use of opaque and vague terminology in Terms of Service combined with the lack of skill, knowledge and will that surround usage and consent mean that understanding of the socio-technological conditions which users commonly accept can at times be 'vague, simplistic, sometimes mistaken' (Gillespie 2014: 185). It seems then that for the Calum – as well as many of the other participants – merely consenting to autoposting as part of the terms and conditions of app use does not equate to a sense of unconditional consent in all circumstances.

Furthermore, the fact that Calum realised these pictures were being publicised on Facebook only *after* his friend had 'liked' them highlights a form of opacity unique to autoposting: that is, unlike other posts that are consciously written by the user themselves, autoposts by apps do not always appear on a user's Timeline or Newsfeed. The fact that these autoposts are invisible to the very individual that has supposedly 'written' them renders action against such autoposts impossible – unless the autopost is made visible by another user's acknowledgement of it. This characteristic undermines the control usually afforded to users in regards to self-writing on Facebook; the other 'technologies of the self' available to users (status updates, photos uploads, 'shares') can be edited or deleted. The invisibility of autoposts to the users that 'write' them thus again throws the notion of 'informed consent' (McStay, 2010) into question. The lack of control that users enjoy over autoposts is one of the reasons why app autoposts are apparently being phased out by Facebook (Zuckerberg et al., 2014). For now, however, it seems that the unintended taste

performances disclosed by apps can have tangible consequences for current Facebook users.

A key theme that emerged from Calum's account, as well as from other participants, was thus the perceived control afforded to them concerning the posting of content by apps on their behalf. For example, Marc, who had no specific negative experiences of autoposting, did acknowledge that he enjoyed publishing his running activities to Facebook through the 'Sports Tracker' app – he stated that 'I get a few likes now and then if it's a particularly long run'. The key difference here between Calum's and Marc's experiences is that Marc actively instigates posts from the app, rather than the app acting in his stead. Thus, in Marc's account, the app functions more like a tool than an actor, and thus works to support his intended identity performance, rather than disrupt or work against it.

As Calum explains, the unintended disclosure of the suggestive content was soon rectified – unlike Beth and Kevin, who at times felt compelled to regulate their self-performances to suit the operational protocols of Spotify/ Facebook as well as the scrutiny of their Facebook audiences, Calum found a way to disconnect his Instagram account from Facebook, though he admits that finding the settings to action this disconnection 'was a bit of a job'. Though Calum's engagement with Instagram had some unintended outcomes, his negotiation with the Tinder app gave rise to another set of circumstances that worked very much in Calum's favour. He explained how Tinder works:

Right how it works is, it's a dating website for gay, straight, bisexual, whatever, you know it's just a pan-dating website shall we say, um, and, you cannot communicate with anybody on Tinder unless you like each other... the only information people see is what it takes from your Facebook profile.

He notes, however, that there are loopholes in the functionality of the Tinder app which mean a user can exploit the system's connectivity to Facebook, thereby giving a user increased access to other users' profile information:

If you have mutual friends, depending on your privacy settings... if you're clever enough you can go to that person's Facebook friends list and then suddenly see all of their Facebook information.

Calum notes that this illicit access to another user's personal information is only possible 'if

they haven't got their privacy settings amended', but he acknowledges that, in relation to the Tinder app at least, his own privacy settings are in order. Here then Calum is exploiting the connective capabilities of the Tinder app through loopholes in privacy settings that, on Instagram, had caused a moment of performance slippage for Calum himself. Calum's manipulation of the Tinder/ Facebook connection thus exemplifies the potential for users to exploit, rather than be exploited by, the connectivity embedded in the social web. Of course, it is weaknesses in other users' privacy settings that allow for such exploitation; and as such it is those users who, as Calum notes, 'haven't got their privacy setting amended', that are exposed to disruptions of self-performances that can be caused by Facebook apps.

Vignette Five: Autoposts as Spam and Game Posting as 'Chavvy'

This paper has so far centred on the interventions of apps into participants' own self-performances – yet many participants also noted the presence of apps in their friends' Facebook activities. Somewhat surprisingly given their popularity on Facebook, it was friends' posts regarding game apps that were most frequently cited as irritating, frustrating or annoying. As Melanie states of game posts by her friends:

It's advertisements as far as I'm concerned... it's people I know that are advertising these things and it's crafty and I don't like it.

Melanie's observations that games posts are 'advertising' exists in clear tension to Facebook rhetorical framing of these same posts as 'sharing' – yet her sentiments highlight that the like economy is built on a system of social connectivity that can be efficiently monetised by the platforms that support it (Gerlitz and Helmond, 2013). For example, players of 'Candy Crush' can either pay for 'tickets' to proceed to the next level of the game, or they can ask their Facebook friends for tickets via Facebook. Instances such as these render the value of social connectivity as profoundly apparent – the connection between three Facebook 'friends' (the amount of friends needed to get a ticket) is quite literally worth 79p.

Participants' framing of posts by games as 'advertising' or 'spam' suggest that the monetary value of the social web does not go unnoticed by those users implicated in it. These posts by game apps highlight the advertising value of Facebook apps for third party stakeholders (app developers, app owners, data aggregators etc) in terms of advertising. Yet these same posts, according to participants, also hold negative value for users in relation to self-performance on Facebook. For example Sophie (publishing assistant, 28) stated:

My biggest reaction when I see people post gamey kinds of status things is just like I can't believe you play those stupid games, and people actually go down in my esteem.

Similarly, in their group interview with Daniel and Kevin, Rory and Alice took up the idea of game invites as 'spammy' and annoying. Like Sophie, Alice and Rory believe that autoposts on Facebook do affect how others see them:

Alice: Yeah I think I just think people are probably just a bit stupid that's really harsh isn't it, I just think people are bit stupid ... I mean it's slightly hypocritical me saying this because I've clicked through terms and conditions without looking at anything, but I think it's just a sign of people not really paying attention to what they're doing, or not really having the foresight to think oh hold on maybe I should check this because games are really dodgy on Facebook

Rory: I guess there are some people who are just, so [pauses] I don't even know how to describe it

Alice: Were you going to say chavvy?

Rory: Well I can think of somebody who I would class as being chavvy who does, who everything comes through and you think, ah, typical

Alice: I hadn't thought of it as a generalisation but I can immediately think of some people who would fit that bill

The class connotations in this somewhat hesitant and self-conscious exchange are clear

– both Rory and Alice agree that inviting people to play games and posting game posts is 'chavvy'. As Liu points out, social network profiles as taste performances can be analysed through societal paradigms relating to cultural and educational capital (2008) – and here then it seems that allowing a game to post on your behalf can be framed as a 'taste expression' that carries low cultural capital. Thus it seems that apps have a performative capacity to shape and redirect ideas of the classed self on Facebook.

Another participant, Rebecca (lecturer, 27), made an important distinction regarding the publication of game posts. She states:

When I see people post stuff or you know sharing stuff about games, I don't think you're an idiot for playing the game, I think you're an idiot for sharing it.

Thus for Rebecca, it is not the playing of the game in itself that matters, it is making the game play *public* that is seen as detrimental. Here then, Liu analysis of 'destructive information' in relation to the performance of the self becomes especially relevant. As he states:

Any outlier of interest tokens in [user] profiles – such as the inadvertent mention of something tabooed or distasteful – could constitute destructive information and spoil the impressions that users are trying to foster. (2008: 258)

Autoposts by game apps are framed by Sophie, Rebecca, Alice and Rory as pieces of 'destructive information' – the sharing of game achievement is connoted to be detrimental or distasteful. The question of *why* game posts are so detrimental to these users – as compared to other autoposts or actions by other apps – is a complex one that requires critical examinations of class, gender and socio-economic circumstance that lie beyond the remit of this small study. However, as some participant responses suggest, distasteful or detrimental identity performances via game apps seem to involve breach of expected norms and practices on Facebook. For example, when asked why she finds frequent posts from her gamer friends annoying, Sam states:

I think the fact that they don't seem to have any self-control about sharing, so whether or not it's that the app's too tricky or forces you to invite people... but I think it's because I'd see it as being a little bit impolite, or it's just not my version of internet etiquette to spam people with this stuff.

Game app posts by friends for Sam then breach her expectations of ‘internet etiquette’. As McLaughlin and Vitak note, online norms are dependent on the technology that facilitates them. They state that though the offline norms that regulate behaviour tend to be ‘ingrained into children from an early age’, on SNSs sites ‘norms evolve with the technology’ (2011: 3). Autoposting by apps is a developing socio-technological practice that is yet to be accompanied by a fixed set of norms. As such, it seems game autoposts can breach the established socio-cultural norms held by some of the individuals exposed to them. Yet, as mentioned earlier, autoposts by apps may soon be phased out of Facebook structural architecture altogether, due to their unpopularity. It seems then that my participants are caught up in socio-cultural moment that may not last – their negotiations with apps, and their reception of their friends’ performances via apps, signify a transient moment of technological flux that may soon be ‘fixed’ by Facebook.

Conclusion: Regulating Self-Performances via Apps

In his Butlerian analysis web profiles, Cover states that ‘social network activities are performative acts of identity which constitute the user’ (2012: 178). This paper has sought to consider apps as one such ‘social network activity’ capable of performatively acting on the user’s behalf. As I have explored, autoposts by apps constitute utterances of selfhood for those that use apps as part of their Facebook activity. In constituting utterances of selfhood, apps have the capacity to intervene in and disrupt the staged performances of those that use them. The performative acts of apps – such as adding an event to Beth’s ‘past’, causing context collapse for Sam, or disclosing ‘destructive information’ and unwanted ‘taste performances’ for a number of participants suggest that apps are not only tools that ‘help users express who they are’, as Facebook claims. They are also technological actors that hold the autonomous potential to write, and therefore perform, acts of selfhood on behalf of users. Furthermore, if we consider, as Cover writes and as Butler as suggests, that identity performances actively *constitute* the subject, then apps do not simply articulate pre-existing taste expressions of identity on behalf of the user – they hold the potential to constitute* facets of identity for the uses implicated in their connective functionalities. Though apps are not the only technological actors to be imbued with such ‘autonomous existence’ (2008: 15), as Software Studies theorists such as Goffrey (2008) and Gillespie have noted, the struggle for autonomy between technological actants and users is not always made so explicit. Furthermore, Beth’s negotiations with Spotify reveal that apps can intervene not only in present articulations of the self but in past ones too. By adding an unwanted event to Beth’s Facebook history, the Spotify app has the power to quite literally rewrite Beth’s ‘past’ selfhood on Facebook.

As previously mentioned, despite their potential marketing value for external third parties, autoposts are being phased out by Facebook due to their unpopularity with users (a sentiment clearly reflected throughout the vignettes). Where then does this leave user engagement with Facebook's cross-platform apps? The vignettes featured highlight the fact it is unwanted autoposts – posts by apps that are published without the knowledge or instance-specific consent of the user – that hold the potential to undermine and disrupt the identity performances of the users in question. It is important to reiterate, as highlighted by Marc's testimony, that not all posts by apps are detrimental to self-presentation on Facebook: given the right level of consent, control and understanding, apps can and are used by users to display wanted – rather than unwanted – taste articulations. The popularity of apps also suggests that many users willingly and enjoyably engage with apps on a daily basis. It thus seems it is the unconsensual nature of autoposts – wherein the app as tool becomes the app as unwanted actor – that is resisted by participants, and now partly by Facebook itself. Though autoposting (in its current form) may soon be a thing of the past, the monetary value of apps and their capacity to express some element of selfhood – especially in relation to perceptions of taste and class – suggest that the relationship between self-performance and apps use is open to further critical scrutiny.

Finally, this paper has sought to highlight that the intervention of autoposting apps in users' staged self-performances at times transcends the boundaries of Facebook. For example the self-regulation of Beth's listening preferences suggests that apps hold the capacity to reconstitute the self in ways that affect identity performances outside of Facebook. Cover's and Agre's arguments that users' selfhoods can be performatively regulated and even restrictively constituted by SNSs profiles and computational frameworks thus become particularly relevant; by performing the self on behalf on the user, Facebook apps expose users to 'the violence of a normative truth regime that excludes post-modern, post-structuralist ways of configuring identity, self complexity or doing subjectivity otherwise' (2012: 183). In doing so, autoposts highlight the performative power of Facebook apps to constitute particular kinds of selfhood – selves that adhere to the normative expectations of taste, public acceptability and cultural interest, and that suit not only the logic the algorithm but also the monetised, ubiquitous social connectivity that currently pervades the 'like' economy.

Biographical Note

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Notes

[1] As the paper will highlight, although apps form a component of Facebook user's profiles, apps function beyond the confines of a user's Timeline. In fact, some utterances of selfhood as performed by apps never actually appear on a users own profile, but only on their 'friends' Newsfeeds.

[2] The Facebook ticker is a real time stream of 'friend' activity that appears on the upper right-hand side of a Facebook user's Newsfeed.

[3] Two group interviews were undertaken as part of the project – Kevin, Alice, Rory and Daniel were interviewed together, as were Rebecca, Audrey, Sophie, Terry and Steve. The participants taking part in these interviews were not strangers to each other – they were housemates, most of whom were friends on Facebook and therefore constituted part of each other's Facebook networks. Their 'offline' connection as housemates thus added a valuable additional dimension to their interviews, in the form of dynamic exchanges between participants (as exemplified in Kevin's accounts of autoposting) that highlight how the intervention of apps into users' Facebook profiles does not just affect the user themselves – it also impacts on their network.

[4] There are various ways to expand the 'reach' of a Facebook page – through publicising the page on other Facebook pages, other websites and alternative social networks, as well as through 'promoting the page' through Facebook's pay-to-use marketing mechanisms. The 'Plugged-in Profiles' page was publicised through external alternative sites, pages and social networks with a small degree of success (in terms of visibility). However these page 'likes' did not always necessarily translate to interested interview participants. The other option – to pay to promote the page – though a tempting prospect, was not implemented. I felt that paying for 'likes' was at best counter-productive and at worst unethical in relation to my research aims, and as Emiliano De Cristofaro et al (2014) have highlighted, using such Facebook's pay-to-use promotional techniques would most likely have led to 'fake

likes' generated from legally and ethically dubious 'like farms', rather than viable (human) research participants. By far the most successful form of 'reach' thus transpired to be page 'shares' mobilised by other individuals in or close to my own 'friends' network; the outcome of which being that interviewee participants were recruited from networks in close proximity to my own.

[5] Sam preceded her use of the term with the question 'is it ridiculous if I say pretentious media studies words?', suggesting that her mobilisation of this somewhat complex phrase can be explained by a background knowledge in theories of identity construction.

[6] Perhaps Calum was right to be wary. As Beth explained in her interview, the only friend she has blocked on her Newsfeed was a friend who posted too much political content.

[7] The notion that your music and listening preferences tell others something about 'who you are' is not only reinforced in other participants experience of identity performance on Facebook, it is also encouraged by Facebook itself, as evidence in their statement concerning 'social apps that let you express who you are through all the things you do.'

[8] Sam, Beth and Kevin also acknowledged that that autoposting may have been a prerequisite to using the app. For example, Sam stated: 'I must have just got excited and pressed the button and not looked' in reference to signing the terms and conditions for using the Slideshare app, and Beth stated 'maybe it was like in [Spotify's] Terms and Conditions or I just didn't read it properly, but I felt it should have asked me first [before autoposting].' Beth's sentiment highlights an important distinction in terms of consent: though participants recognise that they were required to consent to the possibility of autoposting in order to use the app, they did consent to the specific instances of autoposting that they have had to negotiate.

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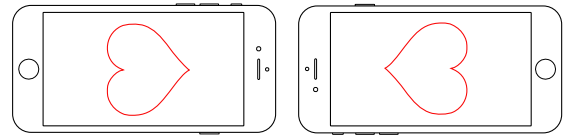
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FCJ-181 There's a History for That: Apps and Mundane Software as Commodity.

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Abstract:

With global app sales estimated at \$25 billion in 2013 and thousands of software developers marketing all manner of services and products as apps, it is hard to deny the importance of software applications for smartphones and other mobile computing devices as an economic and cultural platform. While apps provide many functions previously possible with software, apps represent a new way of producing and packaging software. This article traces a lineage of the term app within the context of the software commodity's longer history. We argue apps, as mundane software, represent a particular affective and contextual experience of software that expands the potential uses of software but also embeds it more deeply in everyday practices.

Introduction

I Am Rich was first released in August 2008 in Apple's iOS App store for \$999 (Milian, 2008). The program's only function, other than displaying an image of a jewel, was a self-congratulatory message that read 'I am rich, I deserve it, I am good, healthy & successful [sic].' It was reportedly purchased 8 times before Apple removed it from the store. *I Am Rich* could be read as clever commentary on conspicuous consumption (Veblen, 1965) in an era of digital and ephemeral goods or dismissed as a trivial piece of software – a novelty joke like an electric shock pen or a whoopee cushion (both of which, incidentally, you can also find as apps). However, these readings of the app's limited functionality and ostentatious pricing miss a much larger story about the way apps have radically reconfigured the presentation and pricing and potential purposes of the software commodity. *I Am Rich* is both a meditation on the value and worth of digital cultural goods and a realisation of what we might call the mundane abilities of software.

Individual apps like *I Am Rich* might at first glance seem meaningless but, collectively, this new format of the software commodity represents a significant emerging economic market and cultural platform. *I Am Rich* is just one of nearly 1.5 million apps available across half a dozen app stores (AppAnnie, 2014b; Ingraham, 2014). With over 100 billion app downloads, global app store revenues were around \$25 billion last year, up 62% from 2012 (Lessin and Ante, 2013). These are projected to rise to nearly \$77 billion in the next 3 years (Gartner, 2014). The app subsector involves thousands of independent and established developers, from hundreds of countries, and the software they create finds its way into smartphones, mobile computing platforms, cameras, televisions, cars, game consoles, and a host of other technologies.

Accordingly, this article explores 'apps' as a distinct format for the delivery and distribution of software and places apps within the longer history of the software industries. Through an analysis of computer and technology trade journals, as well as historical archives (e.g. Computer History Museum, Charles Babbage Institute), we trace the lineage of the term 'app' and the evolution of software as a distinct commodity. Thinking both about the political economic dimensions of the production of software as commodity and the experiential aspects of encountering software in the form of app, we consider 4 key characteristics (micro-control, micro-transactions, micro-functional and micro-material) that are reshaping software's commodity form. On the one hand, apps draw on software's historical liminal status between free, shared or hacked good and paid product to advance various economic experiments for selling software in the digital age. On the other, the presentation of software as app has been key to embedding it more deeply into leisure, commercial, educational, interpersonal and other spheres of everyday activity.

While research in media and software studies has noted the importance of video games, enterprise software, and other popular genres of programs, we look at apps as a particular economic and aesthetic presentation of code to ask what insights reveal themselves if we take apps seriously, if we seek meaning in the mundane?

Mundane Commodities

Apple's iOS store debuted in July 2008 with around 500 apps for its iPhone and iPod Touch devices and saw close to '10 million applications downloaded in just three days' (Apple, 2008). Competitors such as Google, Amazon and RIM followed suit with app stores of their own. The growth in the number of apps and size of revenues from these stores has prompted observers to note we now inhabit a 'Planet of the Apps' (Bruno, 2010) and that each passing year is the 'Year of the App' (Dowell, 2010; O'Malley, 2013; Smith, 2014). With around 58% of U.S. adults using smart phones, and over 42% with tablets, apps are becoming one of the most frequent ways users interact with software (Olmstead, 2014). Games are the most popular type of app, though spending on non-game apps, like news, weather, maps, entertainment, lifestyle, banking, social networking and communication, increased 2.3 times during the last two years (AppAnnie, 2014a; Purcell, et al., 2010).

Discussions of the recent rise of apps, however, ignore the app's place in a longer history of software as a commodity. Apps represent, first and foremost, a particular model for presenting, marketing and distributing software that stands in relation to how software has typically been positioned and sold. This section looks at the history of the term app to trace some of the social and cultural values this particular mode of distribution holds for everyday interactions with software.

We are particularly interested in the app as a specific manifestation of the software *commodity*, since the form of the software commodity holds deeper social, cultural and economic insights about digital goods more generally. Marx called the commodity a strange and mysterious thing, 'abounding in metaphysical subtleties and theological niceties' (1978: 319), but he also grounded commodities in the materials of their production, the labour it took to produce them, and the expectations they held about their eventual consumption. As Lee argues, the commodity is a 'vital touchstone in any analysis of the social relations of capital' because it embodies the social relations of its production and points us beyond the objects themselves to the cultures in which they are made and consumed (1993: 120).

The commodity form is not just a means of selling goods, it is also ‘an objectification of a mode of production at a given phase of [capitalism’s] development’ (Lee, 1993: 120). Moreover, changes to the commodity-form over time become important inflection points for understanding the changing dynamics of capitalism (Lee, 1993). Each phase of capitalism has a corresponding and identifiable ‘ideal-type commodity form’ that embodies the most powerful economic, technological, and cultural forces at work at any given historical instant. Cars and suburban housing during Fordism, for example, were not simply goods that became key industries, but ideal-type commodities around which a whole set of social practices and values formed (Lee, 1993: 129). Kline et al. draw on Lee to argue video games represent an ideal-type commodity form in late capitalism, given the ways games fuse and fuel ‘technological innovation, cultural creativity, and mediated marketing’ (2003: 29). Similarly, Snickars and Vondereau suggest the iPhone is an ideal-type commodity form for the digital age, a ‘media *dispositif*’ that encapsulates a radical break in the relationships among technologies, subjects, and modes of communication and interaction (2012: 5–7). In each case, major shifts in the production or distribution of goods involves an ensuing shift in the commodity form.

Rather than add apps to a list of ideal-type commodities – though they do seem to function as such – we instead want to examine what shifts to software’s commodity form, as apps, tell us about changing notions of software, media consumption and digital goods more generally. We argue apps represent an ideal delivery mechanism for what we are calling *mundane software*: software that spreads out beyond the computer and into a vast range of everyday routines and activity. Mundane software is mundane because it is relatively unremarkable: a to-do list app, a bird-watching guide, an app that mimics the sound of a zipper, etc. This is not to suggest mundane means useless or boring. Mundane software can be necessary, affective, and enjoyable, even if it is for everyday tasks like doing groceries or tracking your exercise. But given the diversity and wide-range of functionality apps provide that seem to defy categorisation or unification, we suggest their mundaneness is precisely what allows for the incorporation of software into a range of everyday practices. This is also not to suggest mundane software is coextensive with apps; there have been mundane programs before apps just as there will likely be mundane software in future iterations of the software commodity. Rather, mundane refers to the everydayness of the features and functions of the software, the unremarkability of the contexts in which it gets deployed, and the very material ways it insinuates itself into banal routines. The favourable economics of production and distribution behind apps, as well as the variety of devices to which they can be extended make apps a particularly effective commodity form for presenting, distributing and using mundane software.

Previous research in management and organisational studies has primarily focused on enterprise software (Rettig, 2007) while media studies has analysed video games social media and other communication programs (Consalvo and Dutton, 2006; Dyer-Witthford

and de Peuter, 2005; Murthy, 2013; Wolf and Perron, 2003). The recent turn to software studies has diversified the kinds of software under analysis (i.e. Chun 2013; Montfort and Bogost, 2009; Fuller, 2008), but there are still few frameworks for addressing the multiplicity of software products available as apps. Juul's (2010) work on casual games and Anable's (2013) ideas around small games address some of the more mundane encounters users have with software, noting that it is not so much content that makes games casual, but features, functions, and context of use (Juul, 2010: 50). Similarly, we do not define mundane software strictly by its content, but rather as an intersection of its form, mode of delivery, the functions it provides (or, in some cases doesn't), and the everydayness of practices to which it can be applied. Games can be mundane, just as productivity applications can be. But mundane also points us to hundreds of genres and styles of applications that do not fit easily within traditional definitions like 'games' or 'media software' or 'enterprise applications'. Mundane software is a way to make sense of the explosion in the types and purposes of software apps represent; a way of finding commonalities in software that individually seem insignificant, but collectively, represent a significant cultural platform for encountering software. Apps represent a particularly effective commodity form for selling and distributing mundane software, for packaging otherwise unremarkable and routine tasks into problems solvable by software.

A History of the Software Commodity

Given the seeming abundance of apps as a now-dominant mode for software delivery, it is easy to forget that software has not always been a distinct commodity. In the early 1960s, computers were so large, expensive and technically unwieldy, that they either came with programs installed by the manufacturer, or contract programmers were hired to create highly specific applications for completing a task (Campbell-Kelly, 2003; Johnson, 2002). Even though IBM and other manufacturers had been using punch cards in ways that resembled later methods of selling software, the future of software as a distinct sector was not evident (Johnson, 2002; Pugh, 2002). Software's viability as a commodity was also challenged by a vibrant hobbyist scene that freely traded code and programs in an effort to build a public knowledge base for working with computers. Hobbyist groups like DECUS or SHARE pooled resources and skills to avoid the per-instruction fee many manufacturers charged users for programming support. [1] There was, in short, little market for software in the early 1960s and little impetus to treat it as an independent commodity (Johnson, 2002: 14).

In 1969, IBM announced its intent to 'unbundle' its software from its hardware. The company divided its programming business into two categories: Systems Control Programming (i.e. free maintenance of IBM operating systems) and Program Products

(i.e. language compilers, conversion aid programs, general purpose utilities, and industry applications) which would be offered under a license agreement (IBM, 1969: 9). Initially a response to a pending antitrust suit, IBM's unbundling helped turn a product that previously seemed unsellable into a value-generating commodity. Given its clout at the time, the IBM announcement is often cited as the origin point of the software industry. More accurately, IBM's decision crystallised a number of practices already taking place in the late 1960s (Campbell-Kelly, 2002; Pugh, 2002) at companies like Applied Data Research (that had developed and released a flowcharting program Autoflow in 1965) and International Computer Program (that published a catalog throughout the 1960s of software packages and vendors) (Campbell-Kelly, 2003: 99).

The software sector grew in the 1970s but it remained largely limited to corporate and organisational uses. The exception, of course, was games. As Dyer-Witthford and DePeuter note, it was in the early 1970s that the roots of gaming emerged as hacks or subversions of military-purposed software (2005: 7–10). Freed from their original military-industrial context, and not originally considered commodities, games later served as ideal-type commodities; they were key sources of growth for a global industry of gaming companies. With roots in hacker culture but also as multi-billion dollar industry, games represent both a threat to, and the epitome of, informational capitalism (Kline, et al., 2003; Dyer-Witthford and de Peuter, 2005). Games, like software more generally, continue to waffle between these poles, between free, shared and hacked good, as well as a packaged commodity (Dyer-Witthford and de Peuter, 2005: 32). Software is simultaneously a commodity and an inspiration for all kinds of hacks, mods, and open source ideas that question the regime of value associated with software. In this light, the move towards apps signifies a concerted effort to capitalise on the perception of software as free and to integrate conceptions of “free” into the very commodification process. In stark contrast to free and open source software movements for desktop applications, apps are content to push free as in free beer, rather than free speech.

As personal computing matured, and games started migrating to computers, a corresponding infrastructure for software products was gradually established. Early word processing programs, for example, which were sold by mail order in the mid 1970s were, by the end of the decade, available in retail franchises like ComputerLand, and Software City (Campbell-Kelly, 2003: 209). The period from 1975–1983 saw a dramatic rise in personal computer software, culminating with around 35,000 programs from about 3,000 vendors in 1983 (2003: 208). These included categories like productivity (e.g. spreadsheets, word processors and database programs), industry (e.g. ledger and accounting programs), and consumer and educational applications (e.g. games, typing tutorials, home accounting/management software), which were available between \$50 and \$500 as disks in shrink-wrap packaged boxes (2003: 208). This relative explosion

in the kinds of software being developed and its capabilities played a significant role in 'personalising' the personal computer revolution (Friedman, 2005; Turner, 2006; Streeter, 2010). This software was not yet what we define as mundane above, but it was moving beyond enterprise and engineering uses, and beyond video games. These new kinds of software helped convince users computers could be devices that, beyond making cold calculations, could help with making grocery lists, home accounting or entertaining children.

This marked shift in the market for software was, fundamentally, 'a moment when contemporary computer technology created a business opportunity for a new mode of software delivery' (Campbell-Kelly, 2003: 3). Given the openness of the personal computer to third party applications, it was a 'gold-rush' period for software development and helped industrialise particular roles within the software industry, like developers, publishers, and retailers (Boudreau, 2012; Campbell-Kelly, 2003: 203, 209). Software's potential as intellectual property also began to be more thoroughly exploited. As personal computing matured through the 1980s, many early software companies failed or were acquired. Mundane software might have flourished had the conditions that created the 'gold rush' continued, but the ensuing years saw much greater barriers to entry for software developers and the growing dominance of a few major publishers and manufacturers (e.g. Microsoft, IBM).

This period also marked the consistent appearance of the word 'app', usually as a shortened version of 'application' meant to conserve space in job postings in computing and IT trade journals (Holwerda, 2011b). Holwerda (2011b) argues that by 1981 'app was already a widespread term [in the tech industry]' and points to software from 1985 that used the term, like the Apple's programming toolkit MacApp, or the Apps menu in Ashton-Tate's office suite Framework II (see also Benson-Allott, 2011: 10). By 1989, tech reporters starting writing about 'killer apps' [2] and through the early 1990s, the term 'app' was regularly used in trade headlines about 'multimedia apps' and 'enterprise apps' (Bozman, 1993: 10; Jarvie, 1991: 83). By the end of the decade, app was creeping into popular usage, traveling beyond tech publications to more general fare, like *USA Today's* Internet 100 index listing of 'software/apps' companies (Krantz, 1999: 3B).

The rise of the web in the 1990s encouraged another gold rush era for developers, via the growth of web-based applications that ran through a user's browser or were available for direct digital download. Given the web's open architecture the emergence of Flash animation programs, media software, email programs, map applications and casual games once again diversified and expanded the capabilities of software beyond desktop publishing and business applications (Boudreau, 2012). Mundane software was starting to

flourish but it was spread out across a variety of developer sites, aggregation hubs, service platforms and file sharing networks. Even though Bill Gates was predicting a potentially ‘disruptive...sea change’ in online software delivery thanks to the move toward internet- and cloud-based computing platforms during the mid-to-late 2000s, the web offered few cohesive venues in which to experience the many emerging types of software (Gates qtd. in Linn, 2005).

This changed with the announcement of the iPhone Software Development Kit (SDK) and Apple’s App Store in March 2008. The original iPhone and iPod Touch devices (launched in 2007) came pre-loaded with Apple-built software such as apps for weather, stocks, calendar, etc. But Apple, long a company that has relied on third party software development for its platforms, encouraged developers who wanted to build programs for these rapidly popular devices to build “web apps” that could be accessed through the native Internet browser on the devices rather than native apps. However, web apps couldn’t make use of any of the core functionality of the devices, and the apps often performed slowly or more poorly compared to Apple’s native’s apps (Ritchie, 2013). Out of frustration, users and developers quickly found work arounds by “jailbreaking” their iOS devices and installing unsigned code (i.e. third party apps) on them (discussed further below).

Apple’s 2008 announcement, then, was as much reactionary as it was innovatory. Part concession to developers, part realisation of an opportunity, the App Store signalled Apple’s opening up of its platform to third party developers. In Steve Jobs’ keynote launch speech, he characterised the App Store as a boon for iPhone users and software developers alike (Jobs, 2008). In addition to the convenience of the app store for users, Jobs promised that the platform would solve the problem of software developers who wanted to ‘reach every iPhone user’ but did not have the distributional resources to do so. As Apple had done a few years earlier with music – when users were looking for music across multiple file-sharing sites, competing formats and limited-content e-commerce stores – the App Store aimed to consolidate software distribution and installation. Rather than having to download software from each developer independently, and then go through variable experiences installing programs, users and developers had one point of contact: the App Store. For developers, they traded access to a potential audience of millions for a split of the software revenues (i.e., Apple takes 30% of all software sales made through the store). The App Store officially launched on July 10, 2008, with apps across a variety of genres (e.g. news, travel, health, games, etc.). The event solidified ‘app’ as its own, discrete form of software delivery, and provided a hub for the distribution and presentation of all kinds of mundane software. Within months, Google launched its Android Market, and RIM announced an ‘application storefront’ for Blackberry devices (Nuttall, 2008). Microsoft and Amazon later joined the trend, prompting trademark battles over who owned the term ‘app store’ (Holwerda, 2011a). [3]

As the central unit of transaction and display in the store, 'app' became more than just a piece of industry lingo; it was a culturally coherent explanation for a new kind of software delivery and distribution. While third party software for mobiles existed before the App Store (as we discuss below), the App Store helped regularise apps as part of the user's experience of those devices. The word 'app' is as much a triumph of marketing as a technical designation (Holwerda, 2011b). A term formerly used as an exigency of publishing has become a thing in itself. 'App' has mutated from industry jargon into the latest iteration of the software commodity imbued with a new sense of software's values, uses, and functions.

So what does the app tell us about the current role of software in everyday life? Bogost argues it is not simply an abbreviated or slang version of the term application, but 'it's also the application itself that's shortened and slanged' (2011). Apps are apps, rather than applications, because they splinter the software commodity into various sellable components and because they break down previously multi-purpose programs into an array of individual, specialised functions. This is partly a business strategy; app stores provide a new market for low priced software and a unified platform for finding and installing software. Apps aim to be the killer app for distributing software. But apps also signify a re-thinking of software's more essential characteristics. Apps present microcosms of designs, practices, and experiences that extend software's capabilities and embed it, and the opportunities to purchase it, ever deeper into everyday routines. They represent an echo of the early 1980s and the late 1990s, when hundreds of new kinds of software (and developers) emerged. But they also limit and control software's long-standing status as a free and hacked good and give it a more standardised articulation as commodity. Apps represent a shift in the software's commodity form, and a shift in the meaning and definition of users' relationships with software.

The term app, then, is more than mere abbreviation. It is also more than what a rigid definition based on size (e.g. a relatively small self-contained program), on device (e.g. available on smartphones, tablets and other such hardware), on acquisition method (e.g. for download from one or more of the app stores), or on purpose (e.g. for specialised tasks like playing a game, checking the weather, writing a list, etc.) could provide. Rather, we define app as a moment in the history of the software commodity when the form, distribution model and economics behind software production have shifted to encourage a proliferation of mundane software and an intensified integration of software into everyday routines.

The App Commodity

I Am Rich stands out in the app store because of how exceptional its price is relative to other apps. It was, at least in the iOS Store, the maximum price at which an app could be sold. Compared to earlier forms of software, apps are supposed to be small, cheap, and plentiful. Like gumballs in the dispenser machines at malls or grocery store exits, apps are trivial, easily consumable, and designed for impulse purchases. Apps fracture the price of software yet offer no standard price, though the most successful are only a few dollars, or free. By countering this trend, by playing with notions of value, price and use, *I Am Rich* asks the same question currently facing a host of software developers, publishers and retailers in these new venues: What precisely is the form of the software commodity and exactly how much is it worth? With the longer history of the software commodity in mind, we turn now to examine a series of apps that, like *I Am Rich*, may not answer this question directly, but speak toward larger shifts taking place in software's commodity form. We focus on four key vectors that characterise the transition to apps: micro-control, micro-transactions, micro-functionality and micro-materiality. Although these have, arguably, shaped software since the mid 1960s, we use the prefix 'micro' to suggest what is novel about apps is not only their small and mundane nature, but how the shifts taking place at the micro level have allowed apps to excel at commodifying practices that were previously outside the realm of software, and established a commodity form that increasingly governs the selling of other cultural goods and digital media as well.

Micro-control

The Cydia app, which is not available in any official app store, is 'an alternative to Apple's App Store for 'jailbroken' devices, [...] specialising in the distribution of all that is not an "app"' (Freeman, 2011). [4] In this case, 'all that is not an app' refers to software that Apple or Google will not allow in their stores. Jay Freeman, the program's developer, claims it has been installed on over 30 million jailbroken devices since its launch in March 2009 (Freeman, 2011). The Cydia store generated close to \$10 million and netted Freeman a personal profit of about \$250,000 in 2011 (Shapira, 2011). Cydia is not the first or the only alternative method for installing and finding apps; the Installer.app offered similar functionality in 2007, a full year before Apple's iOS Store was announced, while Rock Your Phone and other similar stores launched shortly after Cydia (Shapira, 2011). These 'apps' function like regular apps, though they can usually only be accessed after installing special software to jailbreak or bypass the manufacturer's (i.e. Apple, Google) restrictions.

The Cydia store, the apps it displays and sells, and the jailbroken devices that depend on such alternative stores, are all responses to what some users and developers see as too much control imposed by manufacturers like Apple over their devices. For some, the “appification” of software (and the web more broadly) signals a new kind of computing that moves away from generative and open platforms (i.e. the PC, the web) to more closed and tethered relationships (Zittrain, 2008). Although third party access development has generated millions of apps, app stores still employ a variety of different micro-control strategies for coordinating how developers can configure, present and sell their apps, through code suites, SDKs, and other developer literature. Beyond this, some app stores exert even further control through the outright refusal or banning of certain apps. Apple, for example, has a lengthy list of reasons for rejecting apps, including pornography or other objectionable material, apps that don’t work or conform to Apple’s design guidelines, copycat apps, or apps that directly mimic or compete with Apple’s own software (see for example the stories of Kafasis, 2008; Ojeda-Zapata, 2008). Google aims to be more accommodating by making its Android software platform more open source and accessible than Apple’s iOS, but their Play store still enforces a thorough app content policy and bans apps that fail to adhere to it. For those that do get published in the stores, developers are then beholden to a revenue split with the retailers – usually around 30% of an app’s retail price – and any use of in-app transactions must be done through the store (thus, giving the retailers a cut of micro-transactions as well).

Through these kinds of micro-control, app stores represent a fusion of the role of software publisher and retailer. As with the other shifts we examine, this is not entirely novel; publishers and retailers have previously exerted similar amounts of control over the production and sale of software. Nintendo, for example, as a reaction to the crash in the games industry in the early 1980s pioneered techniques to control who was able to manufacture games for their platform (Campbell-Kelly, 2003: 285; Dyer-Witheford and de Peuter, 2005: 85; O’Donnell, 2009). Control, in this instance, was largely focused on ensuring that software met particular technical considerations, rather than aesthetic ones, though hackers and modders quickly and regularly found ways to circumvent the protection measures (Dyer-Witheford and de Peuter, 2005: 85). The difference with micro-control is that, as both publisher and retailer, the manufacturers behind the app stores shape the functions, features, as well as the look and feel of the apps that appear on its platforms. The app stores control the way in which payments take place, the kinds of goods that can be purchased, and the features of the goods being purchased.

The conflation of the publisher and retailer positions app stores as key intermediaries in the presentation and sale of software. It also allows the manufacturers behind the app stores to divest themselves from a significant amount of risk that accompanies the production of software. By controlling the platform on which content is built and the outlet

through which that content is sold, Apple, Google and other app store owners invest relatively little in app software development and succeed in presenting a wide variety of apps. App stores profit despite how many failed apps populate the stores, because any success or failure still renders the manufacturer a portion of the profits. App store owners can also integrate the more successful software ideas they witness into their own products. Apple, for example, borrows from – and then obviates the need for – many apps with each update (i.e. they have in recent iterations integrated flashlight functionality, voice messaging, and disappearing messages, all of which originated in other apps like *Flashlight*, *What's App* and *SnapChat*). The question is less about whether Apple is wrong to borrow functionality it sees as successful in the apps that populate its store, but that developers take on the cost of production and testing themselves, only to be potentially undermined by the owners of the platform.

This arrangement – the exchange of developer labour for the promise of future potential success through exposure to an audience much larger than that which developers could reach independently – exemplifies what Kuehn and Corrigan describe as hope labour (2013: 9). The aspirations of developers, in this relationship, create a powerful enough dynamic to warrant shifting the costs and risks of development onto these individual hope labourers (Kuehn and Corrigan, 2013: 21). App stores and the various app-building programs (e.g. AppMakr, iBuildApp, Good Barber, AppMachine) that allow users to design their own apps with little or no knowledge of programming all preach a rhetoric that anyone can build an app, distribute it and find fortune in doing so. Apple, for example, claims that over 90% of all its apps are downloaded at least once a month, and refers in its press releases to testimonials from independent developers who've gone from amateur coders to globally successful entrepreneurs (Apple, 2013). Proof of 'long-tail' economics in action (Anderson, 2006), Apple uses these numbers to incentivise its growing pool of developers who hope for the success of their app, and find comfort in the knowledge that even in a marketplace of millions, the majority of apps are being tested and tried (Lee, 2013).

But this promise of democratised software development is undercut by banned apps and by the economics of app stores, which favour larger companies with a healthy portfolio of software. It also stands in contrast to other research that suggests that 68% of smartphone owners used five or fewer apps on a weekly basis, with many purchases being forgotten almost instantly (Purcell, et al., 2010; Austin, 2013). Some analytics firms even suggest that a majority (close to 60%) of the apps in the app stores are 'zombie apps' – apps that receive a download or two every now and then, but 'never appear in any of the thousands of charts published by Apple' or other app stores (Lee, 2013). [5] Although it's hard to know precisely how many zombie apps might exist, it is clear that the ability to get noticed on the app store is increasingly a difficult task. As a result, 'only 2% of the top 250 publishers in

Apple's App Store [and 3% in Google's Play store] are "newcomers" (Rubin, 2013).

So while app stores may have sparked the creation of thousands of pieces of software, they have not entirely shifted the balance of power in the software industries. Only a small percentage of app developers (12%) are successful while a large number (34%) make less than \$15,000. Developing products for app stores relies on a significant amount of hope labour and suggests that long tail theory of cultural consumption is not necessarily economically viable for many at the long end of the tail. There's been little change in the developer profile as well, which remains overwhelmingly male (94%) and American (54%) (Austin, 2013). Cydia, and various jailbreak tool kits, attempt to counteract some of the instances of micro-control; they list any app in their stores and do so in a much quicker period of time than the official stores. Because there aren't as many users with jailbroken phones, these stores also promise better visibility for developers and their apps. However, these alternatives to more closed and controlled systems still take 30% of the sale of any app. They also serve as a grey market space for testing innovation for manufacturers. Many of the features that emerge on the Cydia store, for example, serve as the basis for future versions of Apple's various software and hardware capabilities, like the ability to record video, to send pictures via text message, to customise home screens, etc. (Heath, 2012, Wortham, 2009). In other words, even though these alternate stores (or, we would argue, open source platforms like the Ubuntu app directory) attempt to specialise 'in the distribution of all that is not an app', they still exert micro-control and are subject to the commodity constraints that come with apps.

Micro-transactions

This level of control over the store manifests itself at the more immediate level of the transaction. *69 Positions* is a racy "lifestyle" app that offers descriptions and silhouette illustrations of sex positions to help you 'brush up on all the classics, while adding many new and exciting positions to your repertoire'. The app – which reportedly has 7 million downloads – was created by college sophomore Michael Karr, who had little prior knowledge of software programming but had gathered the positions 'from research and personal experiences' (Slattery, 2011). Despite the name, the full version of the app, available for 99¢, offers 113 positions. The free, lite version has 26 positions.

Karr's app is one of hundreds of apps that offer in-app purchases. Linked to a credit card account, in-app purchases allow users to make contextual purchases from within apps without having to exit the software (in Karr's case, the in-app upgrade unlocks

more positions). Other apps feature much more complex and layered in-app purchases: new levels or weapons (e.g. *Lego Star Wars*), maps (e.g. *Garmin*), yearly subscriptions to fitness coaching advice (e.g. *Argus*). Apple's developer SDK defines four types of in-app purchases: consumable (e.g. extra health points or experience points), non-consumable (e.g. extra chapters in a book, extra songs on a music app), non-renewing subscriptions (e.g. limited term purchases or location service subscriptions) and auto-renewable subscriptions (e.g. newspapers and magazines). Each of these micro-transactions integrates the purchase process directly into the software experience. Apps represent a commodity form that seamlessly blends commerce and use.

Apps are micro-transactional entities most obviously because they are largely available for a small price. In 2012, the average price paid for an app was just over \$3.00 (Austin, 2013), though if free apps are factored in, this number drops drastically to less than 20¢ (Gordon, 2013). The low price opens up a previously underserved market for software; only the most organised shopper would pay \$30 - \$50 for a grocery list application in boxed software, but at 99¢, software becomes a potential solution for this kind of mundane task. More significantly, apps are micro-transactional because they parcel up previously physical commodities into their component pieces and disperse the purchase process across multiple payment opportunities. Rather than sell a game or software product as a finished and completed good, in this case, the content is divided up into multiple parts, each of which can be assigned its own cost or own manner of access. Apps are not the first expression of software to rely on upgrades, subscriptions and iterative purchases, but the nature of these micro-transactions splices the software commodity in much finer-grained saleable layers than previously possible. Just as digitisation has amplified the disaggregation of the music album into various singles (Bogost, 2011), or even into single musical bed tracks (e.g. Radiohead's 'Nude' remix contest), apps break software up into its most microscopic expressions of value.

This hyper-versioning strategy further establishes software as part of what Vincent Mosco calls a 'pay-per' society, where media and communications commodities are continually parsed into seemingly infinite iterations (1989). Take, for example, the *Biophilia* app, which included songs and games related to Bjork's 2011 album of the same name. Originally listed as a free app that came with one song/game, the app later sold individual songs for \$1.99 each, before eventually listing the app at \$12.99 for all the songs. The staggered release schedule meant that those who bought the tracks as soon as they were released later had to pay for the full app, despite already owning 3 or 4 songs. This kind of repeat purchasing is not uncommon. Apple's support page for in-app purchases, for example, notes how in-app purchases do not necessarily equate to full ownership: 'you can't sync or transfer non-renewing subscriptions and consumable In-App Purchase to another iOS device' and if you lose or accidentally delete apps, you would also lose in-app purchases (Apple, 2014).

This on-going tethered relationship between the user and the software allows producers to extract more value from the same commodity and to exert greater control over the distribution of software and its contents (Zittrain, 2008). Micro-transactions may open up new ways of selling software but they also offer new ways of controlling its flow.

This is true even for free apps which make up close to 90% of all apps (Gordon, 2013). The process for obtaining free apps is transactionally similar to the process for obtaining paid apps; users require an account and download the software in the same ways. Free apps act like advertisements for other paid apps, or like shareware that came before it. But by integrating free software as a legitimate and significant part of the software buying process, the app stores integrate free goods into the larger sphere of commodity purchases. Free apps set the ground for freemium models (where the initial download is free and extra services/features are purchased), and even apps that remain free for the duration of their use rely on data collection, advertising and other very non-free forms of surveillance and monitoring (Andrejevic, 2013). In other words, micro-transactions do not simply raise issues about the value and worth of the software commodity, they also incorporate 'free' goods into a commodified transaction.

Micro-functionality

The Yo app describes itself as the 'simplest & most efficient communication tool in the world'. It allows users to send a text alert to friends that simply says 'yo'. Reviews of the app declared it the 'dumbest' or 'stupidest' app of all time, and 'easily the worst piece of software' even as they admitted to being slightly enamoured with the app's simplicity in an era of information overload (Cush, 2014; Shapiro, 2014; Shontell, 2014). While the app has inspired philosophical reviews about its deeper social and cultural meanings, Yo is not a meta-commentary on the changing nature of communication in the digital age. Rather, it is doing what so many other apps do regularly: distilling from the complex routines, patterns, and activities of everyday life partitionable processes that can be converted into software solutions. More than anything else, Yo is an example of micro-functional software: single or limited-purpose apps that split up and break down complex activities and assign them each a new technology to help.

Micro-functionality is related to micro-transactions. Given the constant ability to update, and the low price point for many apps, developing an app that has small and mundane functions is economically more feasible than what was previously possible in the era of boxed software. While 'home management software' in the 1980s that allowed computers

to run home appliances, operate lighting, and control security devices and other mundane software existed, the genre ‘sunk without a trace’ in the 1980s since the market cohered around more successful products, like word processors (Campbell-Kelly, 2003: 226). But now with apps, as Bogost notes, multi-function software suites are giving way to programs that are ‘purpose-built for a specific function... or just as often, for no function at all’ (Bogost, 2011, n.p.). While there are plenty of multi-function apps available, apps have also fostered an abundance of software programs designed to meet minor, micro and mundane tasks. This is partly what is at work in apps like *Hold On*, an app that lets users put their finger on a button to see how long they can hold it for, or *Taxi Hold 'Em*, a button-free app helps users hail a cab by displaying a flashing, yellow ‘TAXI’ sign and producing a whistling sound. Apple’s marketing slogan – ‘There’s an App for That’ – is not just a self-congratulatory tagline but a condensed manifesto for a world in which all problems have solutions in software.

The kinds of devices on which apps currently work also further the development of micro-functionality. Apps are spreading out to watches, TVs, cars, fridges, and a variety of other devices, as these devices start to provide the ability to check the weather, play music, or connect to social networks (Cheng, 2012). With ‘smart appliances’ fuelling a wider discussion on ‘ubiquitous computing’ and the ‘Internet of Things’ (see for example Wasik, 2013), apps emerge as the central interface through which these science fictions meet the consumer in the realm of the possible. Futurists envision scenarios where fridges can automatically replenish groceries, or homes can light and heat themselves based on the movements of their occupants (Wasik, 2013), but these fantasies rely on the micro-functionality of a variety of context dependent software and devices. If ubiquitous computing is the next step in computing, mundane software is what it will run on.

Micro-materiality

As developers see apps as a successful emerging model for the distribution of the software commodity, they begin reimagining how other interactions with software and digital media can take place. *Coast*, an app produced by Opera Software, highlights a phenomenon tech critics call “appification”, where the functional and design aspects of apps become increasingly central to user experiences with all kinds of software and technology (Aggarwal, 2014; Hay, 2010). *Coast* ‘appifies’ mobile web browsing by offering a visual interface that presents different sites and platforms like YouTube, Facebook, and Gmail as individual, app-like icons. As one report suggests, *Coast* ‘feels more like a dedicated content consumption app than a Web browser’ (Campbell, 2014). Opera’s app relies heavily on a kind of app aesthetic as a primary design strategy for its service. It suggests apps

aren't just limited to apps, but they represent a larger mode of organising and presenting information.

Coast's attempts to make web browsing more like using apps points to the micro-materiality of the software commodity. Given its composition as code and information, software has long hovered between immaterial and material good. Despite their seeming inconsequentiality and evanescence though, apps express their materiality through their underlying code, their interface design, and their use of hardware affordances to provide particular haptic and physical experiences. Rather than immaterial, apps are instead, like software more generally, 'differently material, tenuously material, almost less materially material' (Berry, 2012, n.p.).

As the building blocks of function and design, the app's code (usually in programming languages like Objective-C or Java), is the most basic element of its materiality. Galloway's (2004) dictum that "Code = Praxis" reminds us that, while SDKs and programming suites (such as Apple's xCode) promise to make software development for mobile distribution platforms both relatively easy and open, they also standardise and control the kinds of functions software can provide and shape the aesthetics of the finished product. Developer guides from Apple and Google highlight the expectations the companies have for any program that will be available through their platform, and these stated expectations are often embedded in the tools that accompany the SDK.

The code's materiality manifests in an app's interface and design, both of which are crucial elements of app development. Apps appear as icons on the home screens of devices which follow the icons-on-desktop graphical user interface familiar to computing, but their chicklet-sized covers and square rounded edges are evidence of an influential design strategy that has, as the example of *Coast* suggests, moved beyond app stores to web designers more broadly. The app icon gives way to the app's own interface, which is a combination of developers' desire to establish their own style while still working within the confines of a larger pre-coded environment. There are, of course, distinctions between the various app platforms. Google, for example, follows a 'simple, beautiful, useful,' cross-platform aesthetic (Sapnar Ankerson, 2014) while Microsoft relies on multicoloured, differently sized, dynamically changing app icons. Developers must adjust their applications to suit the aesthetics of each store and to account for the particular affordances that occur across devices (e.g. smartphones, tablets, game consoles, TVs, etc.). These micro-material aesthetic decisions are no small matter; recent reports suggest that design matters as much as price, usability, and brand loyalty in determining app use (Bjoran, 2010), and that an app's icon has a significant effect on user psychology when it comes to finding and purchasing apps (Kai-Chun and Chen-Heng, 2013).

The micro-materiality of apps is also evident in the hardware platforms on which they run. While most apps invite material interaction through touchscreen taps, swipes, or voice recognition, some apps draw on other affordances to make unintended uses of a phone or tablet's hardware. For example, apps that turn your phone into a flashlight (using either the camera's flash or the phone's display) are common across all platforms and apps like *Pocket Heat*, *High Tech Hand Heater*, or *Handwarmer* activate several CPU functions to heat up the phone. The *Blower* app blows air through an iPhone's speaker to blow out on-screen candles, while games such as *Bubble Blower* deploy the same functionality to create a virtual bubble. By capitalising on the limitations of a mobile phone or tablet's physical capabilities, these apps emphasise the materiality of this form of software.

Mundane apps may seem ephemeral and transient in their form, then, but these examples illustrate how they are part of a much longer chain of materials that stretches from their code to the aesthetics of their interfaces to the interactions with their hardware. This chain does not stop simply at the material interactions with the software we list above. Brophy and de Peuter's (2014) recent work, for example, examines the circuits of labour that coalesce to create the various materials that make up the digital devices that supply apps. They trace the flow of materials from the extraction of precious materials and metals like coltan in militia-led mines in countries like Congo to the assembly materials and questionable labour practices in Chinese electronics factories to the immaterial labour of the vast network of call centre support workers, as well as the materials for coding and creating among dispersed developers (Brophy and De Peuter, 2014). Similar to the activist app *Phone Story*, their argument makes clear that underneath the sheen and the minimalist design of devices that seem to deny their materials in a quest for lightness, smallness and speediness lies a very real material path (or a path of materials). Apps remind us that the interfaces with which we interact depend heavily on the materiality of their platforms.

The App Imaginary

In an art exhibit curated by Paul Miller and Svitlana Matviyenko (2013), various artists, technologists and other contributors present a series of 'Imaginary Apps': apps that respond to the question 'What is the most desirable, terrifying, smart, ridiculous, or necessary app that has not been and, possibly, will never be released?'. One app, called *The Ultimate App*, describes itself as follows:

One tap launches *The Ultimate App*, immediately initiating an in-session payment. Upon completion of the payment, the app elegantly closes itself. With seamless in-app payments,

you can be finished using the app in seconds. No fuss, no muss - an app that performs its own finitude quicker than most. [...] For the low per-use cost - only \$0.99, €0.99, £0.99 (regionally).

For these imaginary app designers, their artistic intervention boils app usage down to its most essential function, the transaction. *The Ultimate App* is a commentary on how, stripped of some of their other dressings and distractions, apps are an incredibly efficient form for the delivery of mundane digital commodities. Apps split software up into multiple component pieces, into micro-functions that extend the layers at which transactions and purchases can occur. Through their micro-materials they instill a particular affective relationship with software that is highly personalised and individualised, and extends the potential uses of software into a host of mundane activities. Their incorporation of micro-transactions allow for an iterative commodity (i.e. one that keeps supplying purchase opportunities) that legitimises and captures 'free' into an economics of the transaction. Software, in this case, may have little or no price but it still operates according to logics of commodification and micro-control. *The Ultimate App's* embrace of the transaction as both routine and essential speaks to how significantly mundane software in the form of apps has altered the shape of software's commodity form.

If part of what makes apps mundane is a micro-functionality, materiality and transactionality that enables them to be easily and subtly incorporated into daily routines, an app that does nothing takes such mundanity to its logical conclusion. But *The Ultimate App's* critique of digital capitalism ignores many of the other useful and affective responses users have towards apps, and some of the possibilities apps might represent for extending not only the kinds of software available, but also the kinds of developers engaging in software production. As Anable (2013) notes about casual games, apps can be 'affective systems that mediate relations between players and devices, workers and machines, and images and code (and our feelings about those relations).' Mundane software like the Yo app or *Coast* may seem trivial or banal, but it is within the routine, everyday interactions that such programs manifest that software's commodity form is being re-imagined. Software began its history as one with the machines and platforms on which it was available, until developers, manufacturer, publishers and retailers found value in treating it as a distinct commodity. Although software came to represent an ideal-type commodity for informational capitalism, it never fully left its liminal state between priced product and hacked resource. This tension remains, though apps represent new attempts to capture perceptions of free and to put them in service of further commodification.

It is through their specialised functions, their iterative transactions, their novel materialities that apps have been able to so pervasively extend the reach of mundane software. This

has offered new means to control the flow and the shape of the software commodity. It has also helped software spread beyond computers and mobile devices to a whole host of technologies, practices and aesthetics.

Biographical Notes

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Notes

[1] DECUS was a support group for DEC computer users who freely shared software under the motto 'Steal from your Friends' (Richards, 1965). SHARE was founded in 1954 to discuss how to use, install and market a programming language for IBM Systems called Mark IV (Campbell-Kelly, 2003 31–34)

[2] Killer apps are usually considered to be software that is essential enough to a particular technology or operating system that it could drive sales of that platform. The longer 'killer application' had been used to refer to the same idea before 1989.

[3] Following Apple's long-standing practice of sending cease and desist letters to others using the term 'app store' (Holwerda, 2011a), they filed suit against Amazon's 'Appstore'. Apple eventually withdrew the suit, but the incident brought a fair amount of discourse regarding the meaning of 'app' and who had ownership over it.

[4] Jailbreaking allows users root access to their mobile devices and allows them to alter their phones in ways unintended by the manufacturer. It was originally treated as an illegal activity, and Apple would send out updates that rendered a user's jailbroken phone unusable. Jailbreaking has since been ruled a legal practice.

[5] This study was later called into question for methodological reasons; the company was a firm that sold developers on a service for helping their apps get noticed. It was in their best interest to portray the app store as a chaotic mix of apps with little hope for indie developers to ever get their app seen or noticed.

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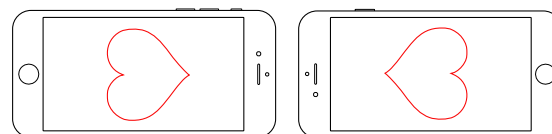
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FCJ-182 Middlebroware

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Abstract:

Software for creating, editing and organising media content occupies a significant place in the contemporary production of culture. Through a combination of scholarship from traditions in science and technology studies, media studies, and the sociology of art, I develop a framework for understanding the symbolic ordering of such software based on the entanglements between objects and subjects through commoditisation. In the first half of the paper, I construct a conceptual framework around ‘middlebroware’ as a means of conceptualising and analysing the processes of symbolic ordering that take place through the design and use of certain kinds of commoditised media software. The latter half of the paper will apply this framework to a case study of Photoshop as an example of middlebroware.

Introduction

In the introductory chapter to *Software Takes Command*, Lev Manovich (2012: 31) justifies his decision to focus his study on software applications instead of ‘the activity of programming’ by arguing that the former – for the most part commercial application software like

Photoshop, AfterEffects, and Final Cut Pro – represent the tools of ‘mainstream cultural practices’ of digital media production while the latter represents an exceptional practice. Manovich’s self-justification serves as a useful starting point for this paper because it draws attention to two sets of interrelated questions regarding contemporary digitally mediated cultural production.

The first set of questions stems from Manovich’s acknowledgement that digital media producers, including people who program, represent a significant group of cultural producers (Dovey and Kennedy, 2007; Mackenzie, 2006: 32–33). But recognising programmers as cultural producers raises a classificatory challenge: is the practice of programming necessarily a distinct form of cultural production in relation to other forms of digital culture? Is this distinction based on a privileged access to certain properties of digital media? Some have taken the ranking of programming above other forms of digitally mediated practices as far as proclaiming that one should ‘program or be programmed’ (Rushkoff, 2011). However, it is impossible to make distinctions between using application software and programming for the production of culture without clarifying the complex and contingent symbolic categories that make such distinctions possible; categories like ‘mainstream’. It is certainly possible to identify examples of programming that could qualify as ‘mainstream practices’ if by mainstream we mean practices that are driven by large-scale commercial markets. For example, manufacturers of mobile devices have turned to ‘app markets’ in order to provide users with access to new applications. Part of this business model entails scaling up the number of developers who produce apps for these users through ‘crowdsourcing’ (Bergvall-Kåreborn and Howcroft, 2013). Based on such an example, ‘mainstream’ and exceptional do not seem to be sufficient categories for distinguishing between programming and other digitally mediated practices.

The second set of questions stemming from Manovich’s justification relates to a topic that he has done much to draw attention to in his work: how should we classify the work of practitioners who use application software? In light of the first set of questions, to what extent are the people who use application software enabled and constrained by their use of this mainstream ‘media software’ – ‘software for creating, editing and organizing media content’ (Manovich 2013: 24)? If, as Manovich argues in his book, the rise of social media represents a new and improved class of media software, what future is in store for practitioners who remain wedded to ‘old’ media software like Photoshop or Final Cut Pro?

In this paper, I set out to address the modes of ordering subjects, objects and practices of digital media production by building on Manovich’s original definition of media software in a way that explicitly addresses symbolic relations of power for the production of culture. Combining scholarship from traditions in science and technology studies, media studies,

and the sociology of art, I set out to investigate the distinct modes of ordering* *(Couldry, 2012: 66) cultural work with media software. This approach entails lending a greater amount of attention to the socio-material assemblages that constitute the subjects and objects of digitally mediated culture. In the first half of the paper, I construct a conceptual framework around 'middlebroware' – defined as the configuration of commoditised media software and its related practices of design and use – to conceptualise and analyse the processes of symbolic ordering that take place with media software. The latter half of the paper will apply this framework to a case study of Photoshop as an example of middlebroware.

Configuring users and designers for the production of culture

Computer engineers and software developers draw from definitions of what constitutes a user to design hardware and software. These definitions change considerably over time and are contingent upon broader social and technological relationships that mediate design and use (Grudin, 1990). Scholars like Steve Woolgar (1991) use 'configuration' to analyse the processes involved in designing 'the user' into semiotic and material assemblages of computational infrastructure. For Woolgar, studying how the user is configured entails studying how different groups of designers – from engineers to marketers to user-experience designers – mobilise different, and at times competing, definitions of the user as part of the process of designing information and communication technologies. Configuration has since been critically refined by a number of scholars who challenge Woolgar's initial focus on designers, arguing that one should also recognise the contributions of end-users in the different stages of configuring users of information and communication technologies.

One example of this refinement is Silverstone and Haddon's (1996) study charting the 'domestication of information and communication technologies' (ICTs). By following the career of an information and communication technology from its early inception to its subsequent consumption, appropriation and conversion by families, they argue that social groups like the family within the context of everyday domestic life represent key contributors to the articulation of meaningful uses of ICTs. A second example of this refinement is Leah Lievrouw's 'reconfiguration': a mode of communicative action 'where users modify and adapt media technologies and systems as needed to suit their various purposes or interests' (Lievrouw, 2011: 4) by reinventing or hacking these same technologies or systems. Reconfiguration draws attention to the contingency of ICT designs once they are in the hands of groups of users who have the technological skills required to alter said technologies. Finally, a third example of how configuration has been

adapted is a focus on how end-users are included or excluded from the processes that configure the user for ICTs (Hope and Amdhal, 2011).

The above examples extend configuration into an open-ended and contested process whose stakes have always encompassed more than the ‘merely’ technological to include how technologies are always already embedded in the social and the cultural. With this in mind, the following definition of configuration by Lucy Suchman seems particularly adequate for the purpose of this paper:

[...] a device for studying technologies with a particular attention to the imaginaries and materialities that they join together [author’s emphasis], an orientation that resonates as well with the term’s common usage to refer to the conjoining of diverse elements in practices of systems design and engineering. (Suchman, 2012: 48)

As part of her discussion of configuration, Suchman reverse engineers the term to distinguish between ‘figuration’ as the physical, symbolic, and emotional work of disentangling subjects and/or objects from techno-social assemblages and the prefix ‘con’ to refer to the bringing together of such figurations. Her definition of configuration can be understood as a call to investigate the politics of differentiating and converging relationships between designers and users through techno-social assemblages (Voss et al., 2009: 1).

Configuration scholarship problematises notions of subjectivity surrounding the design and use of technologies like media software. The practices of designing and using media software are predicated on pre-existing yet contested definitions of cultural subjects and objects for the production of culture. At stake in these definitions is the ability to define the orders of worth for culture. Returning to the above example of classificatory distinctions between the practice of programming and the practice of using application software, there is a politics of figurations and configurations at work in defining both categories of practice. The devices of figuration and configuration are used to explore the different divisions and unions that make-up cultural production: how one distinguishes the graphic designer and her application software from the app developer and her software development kit. But as Suchman makes clear, the project of studying configurations cannot be dissociated from their politics of cultural historical imaginaries (Suchman, 2012: 52). In the case of the production of culture with media software, this politics includes how media software remediates pre-existing classificatory distinctions between elite and popular, or mainstream and exceptional, and, finally, how people can use these distinctions at the expense of others. With this in mind, I put forward a conceptual framework that addresses

the historical specificities of the politics of cultural production with media software in the following section.

Defining middlebroware

Tackling the politics of configuration for the production of culture with media software requires a conceptual framework that draws attention to the distinct ways in which people redeploy modes of ordering subjects and objects through the design and use of media software and how such positions constitute a symbolic order for cultural production. I propose ‘middlebroware’, a portemanteau that combines ‘middleware’ and ‘middlebrow’, as one potential framework for such a study.

Middleware

The term ‘middleware’ is used among computer engineers to refer to software that operates between ‘front-end’ applications and ‘back-end’ computing resources. It is:

Software that mediates between an application program and a network. It manages the interaction between disparate applications across the heterogeneous computing platforms. (Howe, 1985)

While it is unlikely that computer engineers and other computing experts would consider media software ‘proper’ middleware, the term is fitting in this case because it evokes an invisible or implicit mediation: just as middleware serves as a kind of ‘software glue’ (Wikipedia, 2014), software for cultural production can serve as a similar type of ‘glue’ for cultural work – enabling and constraining the production, circulation, and appreciation of cultural content.

It should also be pointed out that the suffix ‘ware’ as applied to this context reasserts an earlier meaning that precedes its first use in print as a means of distinguishing software as ‘the carefully planned interpretive routines, compilers, and other aspects of automative programming’ from the hardware ‘of tubes, transistors, wires, tapes and the like’ (Tukey,

1958: 2). I use ‘ware’ in this context to reaffirm the traditional use of the suffix to name various commoditised categories of goods or materials that share a particular property or function: stoneware, earthenware, tableware, etc. The first trait that characterises middlebrowware is therefore software for creating, editing, and organising media content whose design and use are brought together through organising principles of commoditisation.

Middlebrow art

Pierre Bourdieu et al.’s (1990) study of photography in 1970s France may seem like a dated point of reference from which to draw concepts for an analysis of digital media. Their study chronicled how diverse groups of photographers from domestic spheres of production (like members of amateur photography clubs) to professional and semi-professional fields (like magazine or sports photographers) understood and positioned their works in relation to broader economic, political and cultural frameworks. They argued that photographers who aspired for recognition as part of a legitimate art form faced an enormous challenge due to photography’s ties to so many non-artistic cultural fields; from journalism, to domestic life, to advertising, etc. ‘Art-for-art’s-sake’ represented an ideal that imparted aesthetic legitimacy to practitioners. Photography, however, was treated as middlebrow art (*‘un art moyen’*) by privileged social classes because it was located midway between ‘noble’ and ‘vulgar’ practices (Bourdieu et. al., 1990: 97), leaving photographers condemned ‘to create a substitute for the sense of legitimacy which is given to the priests of all the legitimate arts’ (Bourdieu 1993: 131).

More generally, all those marginal cultural producers whose position obliges them to conquer the cultural legitimacy unquestioningly accorded to the consecrated progressions expose themselves to redoubled suspicion by the efforts they can hardly avoid making to challenge its principles. (Bourdieu 1993: 131)

This conceptualisation of middlebrow culture was based on a distinction between different fields (*champs*) of practice whereby middlebrow cultural practices were subsumed to a commercial logic aimed at a public of consumers while, by contrast, autonomous fields of artistic production involved creators producing for other creators. This framework is relevant for studying the politics of cultural historical imaginaries of media software because it addresses how cultural practices are symbolically enabled and constrained by capitalist logics of commoditisation. It provides the means to analyse how symbolic orders generate and reinforce categorical distinctions to describe reality that in turn enables

and constrains people's ability to deal with said reality (Couldry 2012: 88). Practitioners of middlebrow arts are excluded from dominant institutions because of their indefinite position 'between' dominant categories of practice. In this sense, the 'middle' represents a margin from which practitioners struggle to define their existence as cultural subjects. As Bourdieu and his collaborators so astutely recognised, these midway practices do not benefit from clear and distinct subject or object categories and therefore represent fertile ground for examining how such categories are contested or justified and how such negotiations affect the people involved.

My goal in discussing middlebrow art is not to call for a 'Bourdieuian' sociology of software so much as to draw key insights from this tradition in order to examine how classes of objects, subjects and practices are entangled through software. Based on my critical reading of this conceptual framework in the context of contemporary digital culture, I would like to raise two points that require further reflection and development. The first involves applying 'art-for-art's sake' as a fixed ideal to which all creators, or their audiences, aspire. While such an ideal may have been dominant in French society at the time of Bourdieu and his collaborators' research, the definition of culture and creativity has shifted since the mid-twentieth century, undermining the orders of worth that designated art-for-art's sake as the dominant point of reference for cultural status. The mid-twentieth century saw the emergence of alternative definitions of art subjects within academic institutions (Singerman, 1999) as well as artists calling for 'everyone' to be an artist (De Duve, 1997: 283–292). Contemporary media as an intersecting field of cultural production has also transformed how symbolic capital within traditional arts fields is generated and unevenly concentrated (Couldry, 2012: 153).

Popular discourses of 'creativity' that emphasise individual entrepreneurship and affective commitment to cultural production now occupy a significant symbolic position in the arts and beyond. For example, creativity as a normative value has been progressively assimilated by capitalist modes of production into everyday work (Boltanski and Chiapello, 2005). By the beginning of the twenty first century, 'everyone is creative' has been incorporated into government policy agendas (Garnham, 2005) and is embodied in the entrepreneurialism encouraged for new entrants in cultural fields (McRobbie, 2004).

The impact of this creative discourse has also found fertile ground in the mix of counter-culture activism and libertarian individualism that informs much of the culture of Silicon Valley and the development of media software (Barbrook and Cameron, 1996; Turner, 2006; Lievrouw, 2011: 98–118). Silicon Valley's remediation of culture and creativity came full circle through the work of people like Alan Kay and his collaborators at Xerox PARC whose vision for the graphical user interface involved designing computers to work as 'a

medium of expression through drawing, painting, animating pictures, and composing and generating music.’ (Manovich, 2012: 64).

Based on this account, one cannot study media software under the given assumption that cultural practitioners work within a clear symbolic order that necessarily prioritises autonomous cultural fields over fields concerned with commercial success. Art-for-art’s sake does not disappear with media software but nor does it maintain its status as the benchmark of cultural legitimacy within dominant symbolic orders of digital culture. The sheer diversity, complexity, and contingency of classificatory frameworks circulating across fields of practice represent a considerable challenge for developing media software.

The second point for further reflection that I wish to address involves the dual role of technology within the production of culture. Its first role is as part of the infrastructure of fields of cultural production. Jonathan Sterne’s reading of Bourdieu’s work suggests that he approached the study of technology as bundles of implicit ‘organized social action’ (Sterne, 2003: 370):

[...] technology is not simply a ‘thing’ that ‘fills’ a predetermined social purpose. Technologies are socially shaped along with their meanings, functions, and domains and use. Thus, they cannot come into existence simply to fill a pre-existing role, since the role itself is co-created with the technology by its makers and users. More importantly, this role is not a static function but something that can change over time for groups of people. (Sterne, 2003: 373)

By implication, scholars of technology should avoid attributing the camera as the sole technology of photography or assuming that the camera has a universal function. But Sterne’s take on Bourdieu also implies that one should avoid equating the entire field of photography with the practice of taking pictures. These cautions are relevant in the case of media software if one considers how digitisation has created the impression of a technological society across fields of cultural production (Deuze, 2007: 16–17). The formal properties of works and the tools for the production of culture constitute often-implicit infrastructures for the symbolic order of fields. But infrastructures are not always stable, resulting in significant implications for the symbolic and social order of fields. For example, historical analysis of photography in the mid-nineteenth century demonstrates how attempts to differentiate the photographer-subject from other types of social actors in the field (Battani, 1999) – what I refer to here are the figuration of the photographer within the socio-material assemblages that enable and constrain photographic practices – also depended on sorting through all of the technical processes of photography in

order to define what constituted the essential components of producing photographs from the technological processes that were ‘merely’ supporting producing photographs. As long as the practice of making content remained ill defined, it was difficult to articulate a clear and well-defined subject position for the author of such content (and vice versa). Distilling an author-subject from the infrastructural arrangements that support cultural work is a longstanding figuration for establishing order within the production of culture and distinguishing creators from their support personnel. Similar figuration challenges can be found in other contemporary amateur media production such as video (Buckingham, 2009).

The ‘technological’ has been historically deployed as part of cultural imaginaries. As Bourdieu’s work has shown, the technological is deployed within fields of cultural practice to produce categorical differentiations between, for example, what is and what isn’t ‘Art’. Technological knowledge has historically been associated to functional knowledge and to being a working class concern. The contingent links between infrastructure, figurations of authorship, and categorisations of technological knowledge are all the more significant in light of the status of creativity as cultural value discussed above. Even an occupational description of ‘graphic arts technician’ by the government of Canada, for example, emphasises the importance of ‘creativity and talent’ over ‘technical requirements (software knowledge)’ (Government of Canada, 2013). Hierarchical distinctions between technicians and creative talent in fields of cultural production are hardly anything new (Hesmondhalgh, 2007: 64). However one must consider the specific ways in which application software has been configured to the technological without assuming that classificatory distinctions and conversions only take place on a binary difference between ‘technological’ and ‘not technological’. Instead, one must look to the specific combinations of practices, subjects, and objects that encapsulate commitments to technological knowledge and how such commitments can enable or constrain cultural work.

Middlebroware therefore provides a way to examine what is at stake in the competing configurations of cultural subjects in digital media production with a specific focus on how commoditisation works as an organising principle for media software without presuming that such an organisation is static. It recognises that the multiple fields of practice involved in the production, circulation and appreciation of digital cultural artefacts depend on media software that is subjected to multiple orders of worth but that commoditisation creates entanglements within these orders of worth that position subjects and objects to a contingent ‘middle’ positionality. Social actors may attempt to reposition themselves from this middle ground in order to try to produce the ‘right kind’ of figurations from the entanglements of middlebroware.

Middlebroware is a device for studying how certain types of media software enable and

constrain the symbolic ordering of cultural subjects and objects for the production of culture. The principle contribution of middlebrowware to an analysis of media software is therefore to turn our attention to the complex ways in which media software enables and constrains how social actors define cultural categories and deploy such categories to produce symbolic order as part of cultural production. Conceptualised through the trope of configuration, the middlebrow practitioner is conjoined to elements that mediate her ability to draw out a figuration of her choosing. The glue analogy I used earlier for middleware can be extended just as well to middlebrowware in that the category of middlebrow draws together disparate elements to produce coherent practices while also latching these practices to subjects and objects that constrain the acquisition of cultural status.

Studying middlebrowware

I will now apply the above conceptual framework to a case study. The methodological approach used to produce this case study is based on the cultural biography (Kopytoff, 1986; Silverstone and Haddon, 1996; Lash and Lury, 2007) of a digital object. This approach entails collecting biographical material related to the design of the object as well as biographical accounts of those who use the object (Lesage, 2013). By following middlebrowware, I turn my attention to the ways in which subjects and objects are joined through practice with a focus on the ways in which the commoditization of media software enables and constrains techno-social relationships for the production of culture. Studying middlebrowware answers Geoffrey Bowker and Susan Leigh Star's (2000) call to study the 'taken-for-granted' objects through an infrastructural inversion, investigating the overlooked 'middle' of creating, distributing and appreciating digital culture.

Adobe Photoshop was selected as an example of middlebrowware because of its extensive career and because of, as Manovich (2011) puts it, its status as the application that is most closely associated to the category of 'digital media'. The case study is divided into subsections addressing its design (4.1) and use (4.2) for digital imaging but it should also be noted that its mediation is not limited to this specific practice (Lesage, (2014–2015); Lesage and Smirnova, 2015).

Designing Photoshop

Following its successful role in creating a mass-market for printing and publishing technologies in the 1980s, Adobe Systems turned its attention to developing ‘shrink wrapped’ application software ‘for the creative professionals who drive the publishing process’ (Pfiffner, 2003: 101). One of Adobe’s earliest successes in this market was Photoshop, an application it acquired from John and Thomas Knoll in the late 1980s. Photoshop became an instant bestseller and has since become the standard application for digital imaging. In 2015, the official Adobe version celebrates its twenty-fifth anniversary as one of the best-known personal computer applications. Its canonical position was enshrined by the dictionary definition of the verb ‘photoshop’ which became nearly synonymous with ‘digital imaging’:

To edit, manipulate, or alter (a photographic image) digitally using Photoshop image-editing software. (O.E.D., 2006)

Three of Photoshop’s early design characteristics made it a fitting example of middlebroware. The first of these characteristics was how Adobe and its designers defined the market for the application in its early days. Adobe’s “1990 Photoshop Invitational”, for example, was an exclusive event aimed at potential early adopters. Adobe invited a select group of practitioners to collaborate and discuss with some the application’s designers. Participants included representatives of the more elite fields of cultural production such as fine-art book publisher Nicholas Callaway and the British painter David Hockney (Pfiffner, 2003: 102). But along with these lofty aspirations were also ambitions to design an application that would capture as wide a range of cultural practices and practitioners as possible (Poole, 1991: 152; Lesage, 2014–15).

This seemingly incongruous approach, catering to elite creators while also courting general consumers, remained a constant through much of Photoshop’s existence. Adobe would subsequently develop simpler and cheaper consumer spinoffs from the main Photoshop product with apps such as Photoshop Elements.

The second design characteristic was Photoshop’s capacity to import and export in multiple digital image formats: ‘Then and now, much of the code is related to input/output and the myriad of file formats that Photoshop has to attend to’ (Grady Booch quoted in Shustek (2013)). Despite a plethora of options, including .psd, .tiff, .jpg, .bmp., etc., (Brown and Sheppard, 1995: 9–37) there never was one dominant digital imaging format. One

of Photoshop's particular strengths was its ability to deal with a considerable number of digital image formats beyond its own '.psd', allowing Photoshop to accommodate a wide range of different types of images coming from a broad range of sources, making it one of the standard applications for production workflows in digital media (Manovich, 2008: 123).

The third design characteristic was the extensive, and continually growing, number of features and filters built into the application over the course of its existence. Many of these features were not unique to Photoshop (Manovich, 2011). In fact, the progressive 'feature creep' in Photoshop's growth from just over 100 000 lines of code to more than 10 000 000 lines of code in later versions (Shustek, 2013) was a common occurrence in the perpetual upgrade economy (Kline, Dyer-Witheford, and de Peuter, 2003) of commercial application software. In his study of the ubiquitous commercial writing productivity application *Microsoft Word*, Matthew Fuller (2001) argued that these 'feature mountains' were made possible in part by the object oriented programming languages used to design these applications and in part because of the commercial imperatives that drove their development. Citing Michel Foucault's work on the government of the self by the self (the quote cited was itself taken, appropriately enough, from Richard Sennett's work on the corrosion of character in contemporary work), Fuller observed how *Word's* feature mountain configured a particular type of autonomous user, one who was asked to encompass and internalise knowledge of the application.

Photoshop's particular modular design was based on 'plugins'. Some of the Adobe staff found that the special effects features in the original design – particularly its filters – were too 'gimmicky' and inappropriate for a 'serious application' (Schewe, 2000: 18). This difference of opinion may have been due to Adobe's pedigree in publishing in contrast to Thomas Knoll's background as a computer engineering student and John Knoll's background in film special effects at Industrial Light and Magic in California. John is said to have introduced plugins as a way of including these problematic features.

Plugins generated an entire cottage industry of developers for the platform such as Kai Krause's 'Kai's Power Tools', Extensis PhotoTools, and Alien Skin Software's 'Eye Candy'. Other competing digital imaging applications also accepted to 'host' some Photoshop-native plugins including Paint Shop Pro, PhotoDeluxe and 3DMax (Heim, 2014). The release of Photoshop's software development kit (SDK) meant that Photoshop was not only a tool for digital imaging, but also a platform for developing digital imaging tools.

Combined, these three design characteristics ensured that the application could be taken-up by any field of cultural production involving digital imaging: from fashion

photography to web design, from user experience design in videogames to scientific imaging for virologists. As a result, digital image creation and editing through Photoshop was configured to encompass multiple cultural fields.

Biographies of Photoshop users

Because of its deployment in different kinds of workflows, a historical account of using Photoshop from the perspective of a single cultural field would be incomplete. This section turns to an analysis of how people used Photoshop as part of their professional and personal lives, focussing on how people practiced digital imaging in a wide range of different fields including: graphic design, user experience design for videogames, animation, photo-journalism, advertising photography, and education.

While Photoshop's design made it particularly conducive to material reconfiguration, particularly with the availability of plugins, most of those interviewed for this research did not alter Photoshop from its 'out-of-the-box' state. Instead, Photoshop users discussed digital imaging in the context of their own field of practice. Through their accounts, it was possible to discern how they used Photoshop as a means of configuring practitioners by ordering their own cultural subjectivities in relation to the application as well as those of others.

The following analysis draws on 23 interviews with Photoshop users conducted between mid-2012 and early-2014. These interviews were part of a larger research project involving a cultural biography of Photoshop that also included document analysis and participant observation. The interviews were conducted in London, England and Vancouver, Canada. The length of interviews ranged from 45 minutes to more than 90 minutes. Following their transcription, the interviews underwent a thematic analysis. Four themes identified in the analysis are discussed below.

'Photoshop ratios'

A common statement within much of the literature on Photoshop was that practitioners could only know or use a limited portion of the application. For example, Pfiffner's (2003:

121) history of Adobe cited the author and photographer John Paul Caponigro as saying: 'If Ansel Adams were using Photoshop – and he would be using Photoshop, without any doubt – he'd only be using 25 percent of it.'

The exact ratios in such statements – 25 percent or 1 out of 10 – were unimportant. Rather, these statements generally referred to a skewed proportion between the total amount of features available in the application compared to the amount of features one actually knew and/or used. The practitioners I interviewed applied ratios that were similar to those encountered in the literature in order to describe the extent to which they knew the application:

J.V. (male web technician and teacher) 'I think I probably use 10% of Photoshop's features on a regular basis, if that. I don't think I have to know everything about it.'

J.E. (female photojournalist) 'I don't even know all the things that Photoshop does. I know the basics of Photoshop. I know the basics very well. Am I a pro at the basics? Yes. Am I a pro at Photoshop in general? No. Because I'm not familiar with everything that Photoshop does or what you can do in Photoshop.'

'Photoshop ratios' in interviewees' accounts of their experiences seemed consistent with Fuller's 'feature mountain' discussed above. They also reflected a position identified in scholarship on the perpetual upgrade economy whereby consumers of digital products continually revise and improve their knowledge of software due to upgrades. But few participants expressed these ratios with anxiety. Instead, most seemed rather ambivalent about this state of affairs. In many cases it even served rather counter intuitively as a mark of experience. Photoshop's vast mountain of features and continuous upgrades meant that users had to consider what aspects of the application were relevant to their own practice. Acknowledging one's limited grasp of Photoshop signalled that the practitioner could sort out the difference between professional skill and technological knowledge:

G.A. (male graphic designer): '[...] I use it for professional means but I would never say I was a professional photoshopper.'

Interviewer: 'OK. What would be the distinction?'

G.A.: 'Oh, I guess I am wise enough to know that there is 90% of Photoshop that I just don't use because I perhaps never cared for it; never needed to.'

The practitioner quoted above, the head of a small graphic design firm, marshalled the Photoshop ratio* to distinguish between a professional graphic designer and someone dedicated to using Photoshop. He continued by deploying this classificatory order to prioritize a commitment to aesthetic considerations over a commitment to technology:

G.A.: 'I am not the sort of person that will go see what technology, what things you can do, and then try to work a project into that. I do what it is the project needs and then we'll build the technology around that. I have met really proficient people in Photoshop. You [try to] get them to think the other way around: "Is that really relevant to this project, that is, a communication project?" I use it as a means to an ends rather than an end in itself.'

As with other interviewees, this practitioner established the importance of not being preoccupied with technical components of the tools used to execute work in order to ensure that technological concerns remained secondary to aesthetic ones.

Karin Knorr Cetina's work on 'knowledge objects' provided an interesting perspective on the type of figuration and configuration work taking place through Photoshop ratios. She defined knowledge objects as the 'goal of expert work; and they are also what experts, scientists, etc. regularly profess themselves to be interested in, attracted by, seduced into and attached to' (Knorr Cetina, 1997:12). She distinguished these objects from instruments or tools which were 'available means-to-an-end within a logic of instrumental action' (Knorr Cetina, 1997:10). In this sense, Photoshop represented a seductive object. Those who resisted its temptation claimed a privileged position within their field of practice. By acknowledging the unexplored vastness of the application, practitioners who respected the Photoshop ratio were in effect detaching themselves from its potential grasp and relegating the application to the status of an instrument. This type of experienced practitioner also differentiated between experts who used Photoshop as part of their professional practice and 'Photoshop experts' who were users seduced by its vastness and whose contributions were classified as technological support rather than as creative work:

R.B. (Male art director) 'I find that with a lot of people who are proficient at software, it's seldom you'll ever find one who's not ready and willing to help. They really, I think, enjoy the process, they're proud of what they can do and

they, most times, they love it when someone wants a little help, you know?’

“Finding your own way” in Photoshop

A second and somewhat parallel theme was the importance of ‘finding your own way’ in terms of learning how to use the application. Many interviewees related that, through a number of different combinations of features and functions, one could attain a certain result or produce a specific effect with Photoshop. Such statements included:

G.R. (male photographer) ‘What I found was there was so many different ways to do a particular thing in Photoshop. [...] One way may not be the best way but it is whatever you are more comfortable with. That’s what I found. The way I was doing selection and the way she was doing it were different but at the end it is almost the same.’

By stressing the importance of finding whatever method most suited the practitioner, interviewees recounted an individual relationship to Photoshop that could only be maintained through constant personal use, play, and experimentation. Such statements also foregrounded the practitioner’s own agency, highlighting their creative appropriation of the application while also demoting the contribution of individual features within the application. ‘Finding your own way’ was encouraged through training. As one female graduate student put it:

S.S. (female graduate student) ‘[...] if I had any questions about what the tools were or how to use them, I would just ask. And the way they taught it to us [...] it was more like: ‘Try what you can do and if you need help we will help you.’ But they didn’t sit us down and say one by one what everything did, because there is so much.’

Those interviewed who also taught Photoshop within institutions of higher learning, either as a profession or as freelance work on the side, confirmed that students were expected to take the personal initiative to learn Photoshop’s functionalities by experimenting with it on their own. These findings were also confirmed in subsequent participant observation of teaching and learning Photoshop (see Lesage and Smirnova, 2015).

Those who used Photoshop extensively in their regular production workflow explained the importance of mastering ‘hotkeys’ – standard keyboard shortcuts that involved a combination of keystrokes for quickly executing specific functions in the application. In some cases, interviewees explained how they devised custom hotkeys or ‘actions’ – a Photoshop feature whereby users built ‘actions that choose what to do based on one of several different conditions’ (Adobe, 2014).

Some, like the photographers interviewed, could justify having found their own way in Photoshop based on the aesthetic results of the final image they produced.

Although people from other fields of practice made similar claims about the importance of finding their own way, in some cases production workflow processes demanded certain conventions of practice to facilitate the coordination of work among multiple practitioners. For example, a user interaction designer working in the videogames industry described how certain Photoshop files were circulated between different contributors to a project.

T.R. (male user interaction designer): ‘We’re talking about hundreds and hundreds of layers in these [Photoshop] files, it could be up to over a thousand sometimes, they’re very intense.’

Interviewer: ‘You have [digital document] folders for [storing them]?’

T.R.: ‘Yes, so you group folders, and then you colour-code that as well. Because we might have a team, or at least another artist that you’re sharing work with and I’ve gotten files before that are not named and you create a new layer and it’s like layer number ‘791’ or something and it’s so hard to follow what’s going on. So just grouping [the layers] and being diligent on creating Photoshop files is a very big thing here, a ‘best practices’ kind of thing.’

Producing good work for this user interaction designer entailed learning how to keep Photoshop files and their internal components such as layers organised. As with other accounts, poorly organised Photoshop documents, according to the conventions of the particular field, often betrayed its creator’s inexperience. Within such structured workflows, finding your own way implicitly required ascertaining and following the established order of practice.

Photoshop as boundary object

A third theme identified in the interviews was that Photoshop served as a platform for exchanging information with others including across disciplinary boundaries. Susan Leigh Star and James Griesemer (1989) apply the notion of ‘boundary object’ to examine how particular objects can enable links between different communities of practice. For Star (2010) boundary objects are materials that are used by more than one group of practitioners. They can be abstracted to enable shared use between these groups while also being adapted for specific uses by a specific field of practice. For Fred Turner (2006: 72), boundary objects enable individuals to find ‘ways to collaborate and yet retain their individual allegiances to their fields of origin.’

Interview participants pointed to a number of instances in which Photoshop enabled exchanges between disciplines throughout their workflow and beyond. Its mountain of features and continual upgrades meant that practitioners could treat it as an ill structured object that afforded interdisciplinary movement from one field of practice to another through the circulation of files or through the application itself. For example, one photographer could both produce digital images for the web and send the same file to others for prepress work on a print publication. Another example was a user interaction designer’s account using Photoshop to communicate her ideas about certain characteristics of the project to software engineers, 3D artists, and outside collaborators:

N.S. (female user interaction designer): ‘Also I’ll use [Photoshop] as a feed-back kind of tool. [...] Because we deal with a lot of partners that are either outsourcers or just people with [the company] in different studios in different countries [...] we don’t necessarily have the opportunity to have meetings and sit down and talk to them, talk through critiques and stuff like that. So we’ll use Photoshop to mock-up certain notes and critiques and stuff like that and send that back to them for whatever art they’ve worked on.’

But not all practitioners could conduct these interdisciplinary exchanges from equal positions within their fields of practice. Some had to navigate between different social contexts in which they practiced greater or lesser creative control. An unexpected example of Photoshop as boundary object was how it enabled connections between people’s professional and domestic lives. Many interviewees explained how they worked with Photoshop at home. Some had home offices for freelance work while others simply brought their laptops from their workplace to work on projects. In some cases, particularly those who were students or who weren’t yet making money from their work at home,

downloading a ‘cracked’ copy of the application alleviated the cost of purchasing a licensed version of the application. Having a copy of the application at work *and* at home meant practitioners could apply their acquired skills to creating family birthday cards or wedding invitations for friends. It also provided an opportunity to connect between family members through play or exchanges of tips and tricks. In one case, an interviewee who developed pedagogical content for a university expressed feeling little aesthetic control over his professional work. He mentioned in the interview that most of his recent work was focussed on video editing with other application software instead of digital imaging with Photoshop. But freedom to play and experiment was afforded through use at home and in his personal life: playing with the application at home with his son, retouching images on online forums such as Reddit, and keeping in touch with his mother, a professional photographer:

B.I. (male educational media specialist) [18:14]: ‘[My mother] has a coop student right now. A work placement and she’ll call me and go: ‘Is there anything cool I can teach so and so?’ and I’ll be like: ‘Yeah, have you heard about how to do ‘mini planets’ using the polarising filter?’ [...] You know I play around with it and call her up and say: ‘Oh, have you tried this? This might be cool for photos.’ Yeah, I guess there is quite a bit. More in my personal life right now than work, but it depends again on working.’

Photoshop has blurred the distinction between home entertainment and professional work with personal computers since its release (Slater, 1995: 130–131). The visible pleasure that B.I. took from using Photoshop was not realised through paid work but his figuration of a creative practitioner could take shape in an informal domestic setting. Domestic exchanges between family members involved the more ‘gimmicky’ features like the polarising filter example above; indulging in more playful, less disciplinarily sophisticated, experiments. The domestic space afforded social connections to information beyond a specific cultural field and an opportunity to explore the application individually or with family outside the confines of the workplace. While the circulation between domestic and professional was in some ways liberating, it also entangled Photoshop with domestic objects and subjects, making it more difficult to produce figurations of autonomous cultural production.

Configuring Adobe designers

Many of the practitioners interviewed were not aware of alternatives to Photoshop for the kind of work they did despite the availability of open source alternatives for digital imaging

like GIMP. Even those who were aware of alternatives did not seriously entertain the notion of switching to a different application. In one exchange with a designer who co-managed a small graphic and web design team:

A.A. (Male graphic and web designer): 'We could probably switch to Sketch, and I think it would probably do everything we need to do. We'd just have to get used to working slightly differently. But there, you'd be using probably 95% of the feature set. It's much, much more relevant to this kind of digital design. Where Photoshop is just this beast that you can do anything with basically and they never have any interest in actually focusing it, they just build on top of it.'

In a similar way to the Photoshop ratios above, users ambivalently responded to Photoshop designers' strategy of creating a feature mountain as both a strength and a limitation. Just as designers configured the user into their design of the application, practitioners configured a particular type of 'designer' into their use of the application. When discussing the source of Photoshop's design, very few interviewees identified the Knoll brothers as the original authors of the application. Instead, most referred to an abstracted 'they' or 'Adobe' as the creators and stewards of the application. This 'they' was credited with producing an essential industry standard while also chastised for its lack of innovation or clarity. Despite continuous upgrades and new product releases, Adobe and its stable of applications represented a source of inertia. Photoshop's status as the incumbent positioned Adobe as an uninspiring and conservative application designer:

A.A. 'There are companies that inspire you with the way they're led or the decisions they make. [...] They created this set of products a very, very long time ago and then they're clear leaders for a long time and now they're just kind of sitting in that... just try and stay entrenched.'

What remains unclear, and beyond the scope of this particular paper, is the extent to which these and other user figurations and configurations were fed back into Photoshop's design. Such developments are of particular relevance in the context of Adobe's recent turn to a 'software as a service' model for Photoshop and other related products (Lesage 2014–15).

Photoshop as middlebroware

In a way, the French triple meaning of ‘moyen’ as ‘middle’, ‘middling’ and ‘means’ seems particularly apt as a summary of the Photoshop themes identified above. Its design and use was riddled with contradictions: on the one hand it was too complex, it was dated, and it represented a seductive distraction from more important concerns and commitments; on the other hand it was an indispensable industry standard that afforded considerable flexibility for various creative practices. As the analysis of both its design and use has shown, this contradiction stemmed in part from its status as middlebroware – as commoditised media software whose configuration of creativity and the technological was not bounded to a committed field of practice. Its status as middlebroware made it difficult to disentangle the figuration of a cultural subject or object that could be submitted to sustained aesthetic considerations and critique which may help to explain its longstanding success and why it has garnered so little of the critical attention required to support alternatives.

Conclusion

I would now like to return to the two sets of questions raised in the introduction in light of the above analysis of Photoshop as middlebroware. The study of middlebroware as a type of media software provides insights into how commoditisation and creativity, design and use, are configured by social actors as categories for the production of culture. The analysis does confirm that Photoshop, as an example of media software, constrained the symbolic possibilities for defining an empowered cultural subject through use. But this limitation was not universal, nor was it simply due to its formal properties. Instead, different practitioners developed tactics to approach its complex entanglements to commoditisation, creativity and technological knowledge in attempts to figure cultural subjects. Some users made a distinction between their position within their field and their use of the application—for example, through Photoshop ratios. One’s ability to achieve cultural status was therefore not exclusively defined by formal orders of subjectivity, such as a distinction between programmer and user application software, so much as differentiations between practitioners whose technological commitments were entangled between the boundaries of cultural fields and those practitioners whose aesthetic commitments produced a clear cultural figuration based on disentangling one’s creative practice from a commitment to middlebroware.

While the above case study focused on Photoshop, the conceptual framework based on middlebrowware developed in this paper has potential implications for the study of other media software including other application software as well as social media and SDKs. Digital cultural artefacts, including media software, are subjected to multiple orders of worth including forms of commoditisation that create symbolic and affective entanglements that in turn position subjects and objects to a ‘moyen’ positionality.

Biographical Note

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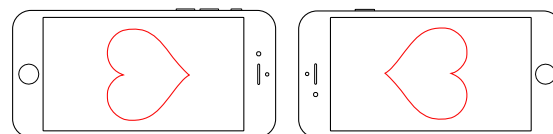
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FCJ-183 iHootenanny: A Folk Archeology of Social Media

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Abstract:

This paper excavates two models of communication that can be found littered across the intertwining histories of folk revivalism and digital culture in the United States. First I examine the Hootenanny, initially a form of rent party made popular in New York City in the 1940s by the group the Almanac Singers, which constituted a complex site of convergence of a range interests, styles, media, and performance genres. Second, I explore how the utopian vision of a community joined in song has been taken up recently by ‘social music’ iPhone apps made by the developer Smule. I will ultimately consider how the mediation idealised by the Almanacs has trickled down to a narcissistic will-to-be-‘in touch’ in mainstream digital culture, making the Hootenanny a virtual path untaken in the history of mobile communication.

Introduction

It has been tempting, for fans of folk music, to celebrate the creative possibilities afforded by Web 2.0 as a sign of the resurgence of something like a folk revival. [1] David Dunaway

(2010), for instance, has divided the history of folk revivalism in the United States into three periods. His first wave lumps together a wide range of collectors, researchers, and activists, from ethnographers to the more overtly political and propagandising efforts of Alan Lomax and others in the thirties and forties. Next is the 'folk boom', which featured the mass-commercial success in the fifties of the Weavers and then the Kingston Trio (Dunaway, 2010). Happily, the folk revival has returned again, according to Dunaway, beginning in the late eighties and early nineties, and the World Wide Web has been a key source of the new varieties of folk expression recently on offer: 'They are pulling out songbooks or warped records from their parents' folk revival, learning to play an instrument or two, and then performing for their Myspace friends or the virtual audience' (2010: 4). Dunaway (2010: 4) cites a *Rolling Stone* article from 2007 that dubs this the 'YouTube Folk Revival', which is defined by a reliance on networked personal computers. With guitar and social media in hand, anyone (at least anyone with a webcam, computer, and internet connection) can interpret any song they like and contribute to an ongoing and apparently organic process (Dunaway, 2010).

One could consider the developer Smule's popular line of iPhone apps as part of this neo-folk media constellation. Their products – including *Ocarina*, *Ocarina 2*, *Magic Piano*,* *IAMTPAIN*, and *Sing!** – allow users to transform their sleek gadgets into expressive and simple instruments, often foregrounding the voice of the user as a key component of recombinant musical texts. Smule apps seem to answer Woody Guthrie's call to his fellow citizens that they must, and inevitably will, soon remember how to sing; they seem to allow us to join together in song as they foster digitalised reincarnations of our most 'organic' and 'timeless' instruments of all, our voices.

This paper will excavate two models of communication that can be found littered across the long, intertwining histories of folk revivalism and digital culture in the United States. [2] First we will examine the Hootenanny, initially a form of rent party made popular in New York City in the 1940s by the group the Almanac Singers. We will see that the Hootenanny (and the ideals that were attached to the concert format) constituted a complex site of *convergence* of a range interests, styles, media, and performance genres. However, for the Almanacs there were explicitly political aspirations at stake as well; the Hootenanny constituted a networked body through which 'bourgeois' distinctions, it was believed, could be challenged. Second, I will explore how the utopian vision of a community joined in song has also been taken up recently by *Ocarina*, *Sing!*, and other Smule iPhone apps. Drawing on the critical literature on 'prosumption' as a novel form of exploitation, however, as well as Jodi Dean's (2009; 2010) work on politics in an age of 'communicative capitalism', I will ultimately consider how the techno-authentic mediation idealised by the Almanacs has trickled down to a narcissistic will-to-be-'in touch' in mainstream digital culture.

Some readers might find it strange to see the labels ‘folk’ and ‘folk music’ appear in an article about iPhone apps. Some might be tempted to reach back for Richard Dorson’s (1976) concept of ‘fakelore’ – a pejorative he wielded at popularising folklore projects, such as the work of Benjamin A. Botkin – and which implied a distinction between authentic cultural growths and fake constructions (see Bendix, 1997). However, following the groundbreaking scholarship of Regina Bendix (1997), whose genealogy of the discipline of American folklore is informed by Michel Foucault’s archeologies of knowledge, the current paper assumes that categories such as ‘the authentic’ and ‘the folk’ are not real objects out in the world, but sites of struggle where competing interests and dispositions clash and compete. ‘The folk’ is a construction set into motion in part by Johann Gottfried von Herder and the Grimm brothers in the eighteenth and nineteenth centuries (see also Storey, 2003), but which has permutated and reverberated into contemporary popular music (Frith, 1981) and digital culture too (e.g. Jenkins, 2006), seemingly eager to encompass novel practices and transformations.

In other words, this paper conceives of the folk and the authentic, not as pure states of being, but as machinic assemblages; particular configurations of ‘folksingers’ will be read here as ‘diagrammatic’ or ‘abstract’ machines, as Gilles Deleuze and Félix Guattari have described them: ‘The diagrammatic or abstract machine does not function to represent, even something real, but rather constructs a real that is yet to come, a new type of reality’ (1987: 142). Machines for Deleuze and Guattari include technical practices and devices but also anything that works—and the dynamic and adaptive abstract machine can be plucked from one structure and inserted into another (on this conception of machines, see also Guattari, 2011). The question for Deleuze and Guattari is not whether or not a given diagram is pure or authentic. The question rather is how well and in what ways a machine, like a Hootenanny or a Smule app, goes about functioning within a context. Thus this is media archeology (see Parikka, 2012), if by another name. What if we were to peel back the grey plastics and clear interfaces of our social media to find the folk, which was a machine all along?

The Hootenanny

The word ‘Hootenanny’ came to Pete Seeger and Woody Guthrie in the late thirties, when the two were touring the country together, playing union rallies and anywhere else they could earn a few coins (Seeger, 1972). The trip is often cited as an important educational experience for Seeger, who was the younger and more inexperienced of the two (e.g. Dunaway, 1981; Seeger, 1972). But there was another important discovery to be made on this tour: in Seattle they found themselves playing a monthly political fundraiser that their

hosts called the 'Hootenanny' (Cunningham and Friesen, 1999; Seeger, 1972). According to the *Oxford English Dictionary*, Hootenanny's pre-revival meaning was 'thing-u-ma-jing' or 'gadget' – a playfully pragmatic catchall with technological connotations. Thus even in this early incarnation in Seattle, the word prefigures elements of digital networks. All sorts of practices and activities could be transmitted through an all-encompassing frame of celebration: food, music, camaraderie, causes, etc. The Hootenanny was a downhome channel of convergence.

The connection of 'Hootenanny' with folk and leftwing musical expression was somewhat accidental, as we can perhaps imagine Guthrie and Seeger finding any number of other semi-archaic terms to employ, such as 'pod', which shares a similar etymology. [3] But nonetheless the word would soon become attached to parties and concerts held at the 'Almanac House' in Greenwich Village, New York City. The residents there, which included Guthrie and Seeger, began to hold 'Hootenannies' on Sundays when they were short on rent, and the events soon became popular, festive events where many notable folksingers and performers might drop by on any given weekend, such as Alan Lomax, Aunt Molly Jackson, and Lead Belly (see Cunningham and Friesen, 1999; Dunaway, 2010). But the Almanac Singers who lived there were perhaps the mainstays; featuring a revolving membership that included Guthrie, Seeger, Sis Cunningham, Lee Hays, Gordon Friesen, and Millard Lampell, the Almanac Singers exemplified the turn to nativism in left-wing American cultural politics in the mid to late thirties (Denisoff, 1971; Reuss, 2000). As Robert Cantwell (1996: 140) describes their style: 'None was a trained singer. Accents, phrasing, vocal timbre, and range, all mixed, both among the singers and with each individually, with a disarmingly unprofessional heterogeneity that drew on a number of flatly incompatible traditions.' The Almanac Singers' Hootenannies were embodiments and extensions of this eclectic, heterogeneous performance ideal. Folksingers, comedians, activists, and storytellers were all welcome, and the audience too was expected to join in on the choruses or even take a turn leading the group.

We can take the Almanac-era utopian idea as a diagrammatic machine: knowledge and culture not as a point-to-multipoint transmission (which is the characteristic process of the mass-media industries, as the Almanacs themselves were well aware) but as a multipoint-to-multipoint interaction. For instance, in the liner notes to the Folkways record *Hootenanny at Carnegie Hall, Sing Out!* editor Irwin Silber (1960: 2–4) lists essential features of the performance form: '(1) Audience participation; (2) Topicality; (3) Variety; (4) New performers; (5) The audience.' Silber's descriptive topography of the Hootenanny posits a diverse, collaborative, self-replicating structure ('authentic' but also sensitive to new historical events and new generations, as is evinced by 'topicality' and 'variety'). The Hootenanny was a distributed network that involved the dynamic circulation of knowledge and affect across audience members, performers, and songs. The Almanacs have been critiqued for effectively 'preaching to the choir' (e.g. Denisoff, 1971; Roy, 2010), but in theory

anyone could plug into the circuit. Indeed, as is the case with more recent digital networks, the more connections the better.

Voices as Machines: iHootenanny Technology

Popular music scholars have pointed to the valuation of 'live' performance by the mid-century revivalists (e.g. Frith, 1981; Keightley, 2001). However, the Almanac Singers, as well as the topical songwriting movement more broadly, considered singing to be a hybrid media form. [4] The 'Almanac' in the group's name refers to the only book, aside from the Bible, that rural Southern families were said to have kept in the house (Wilkinson, 2009). The group was a living text, then, a 'remediation' (Bolter and Grusin, 1999) of collective, singing struggle with the printed word. As well, Phil Ochs's (1964) formulation 'all the news that's fit to sing' – which sums up the broader topical songwriting movement of the sixties, inspired by the Almanacs – figures oral expression through the parameters of print and writing. Topical songwriters were aiming their voices (qua newsprint, qua radio broadcasts) at the noises emanating from states and corporations. In this light, the voice is not a pre-modern relic of nature, but a wired, greased, loaded gun. As Woody Guthrie (1990: 83) put it, 'a song will shoot straighter than a long bore 32–20, and do more damage than the biggest cannon.'

A closer consideration of Guthrie, co-founder of and frequent participant in the Almanacs' Hootenannies, can further extend our image of the early Hootenanny participants' complex understandings of media. Although the photographs we have of him portray a wandering field worker, and though he tended towards Luddite sentiments in some of his early writings, Guthrie also occasionally explored the remediation of folk instruments within distinctly modern media ecologies. In keeping with the progressive spirit of the times, he famously labeled his acoustic guitar a fascist-killing *machine*. But the voice and the body also occasionally seem to be components within a larger system. For instance, in his 'Car Song' Guthrie (1999) revels in the experience of speed that derives from plugging into an automobile, his voice even playfully mimicking a motor in the chorus: 'Take me ridin' in the car, car ... Vroom vroom vroom vroom vroom vroom.' The 'natural', 'organic' voice of Guthrie seems to rev and idle, in between the verses, evoking the larger American desire for gasoline-fuelled adventures and experiences. [5]

Although Guthrie's 'This Land is Your Land' probably still connotes images of rural pastures of plenty, the song is also full of machines and speed. The voice of the song does refer to his feet, as if he is walking across the United States of his own volition. But Guthrie also

gestures towards ‘that ribbon of highway’, which was relatively new at the time; as Robert Cantwell (1996: 137–138) sensitively describes it, ‘the “ribbon of highway” and “endless skyway” owe much to Firestone Tires, Pan American Airways, and *Life* magazine, during a period when America’s celebration of itself could include, without contradiction, its technological and commercial monuments.’ We must also wonder if the voice ‘sounding’ all around him is a face-to-face Hootenanny or rather the radio broadcasts bouncing their way across the nation. Guthrie’s friend Alan Lomax hosted his own programs on a handful of networks beginning in the late thirties, and Guthrie too performed on dozens of radio programs in the thirties and forties, both with the Almanacs and as a solo performer, including on Norman Corwin’s famous *We the People* (Cray, 2011). ‘A voice was sounding’ perhaps refers to both the live and the mediated. Or, perhaps here the distinction does not matter.

Guthrie vividly represents the machinic character of group singing in his pseudo-autobiographical novel *Bound for Glory* (1968), which he largely typed out at the Almanac House, during the period that the Hootenannies were first held in New York (Cunningham and Friesen, 1999). The novel is a *Kunstlerroman* of sorts about a folksinger who makes his way out of the Oklahoma dustbowl during the Depression, on the way discovering the power of song in social struggle. ‘Good’ communality is not simply distinguished from ‘bad’ structures of commerce or individuality, however, for Guthrie portrays a complex social and cultural battlefield. Across the opening pages, for instance, we see a violent and chaotic form of collectivity. Bodies and the train cars that carry them seem to mingle together, and yet the wanderers and ramblers have not yet found a connection:

We looked like a gang of lost corpses heading back to the boneyard. Hot in the September heat, tired, mean and mad, cussing and sweating, raving and preaching. Part of us waved our hands in the cloud of dust and hollered out to the whole crowd. (1968:9)

Guthrie vividly portrays a latent mass not yet sensitive to its collective potency and without a common language or channel. Hands wave into the dust and voices ‘holler’, useless, into the crowd; seeds scatter but none seem to find their way to fertile ground. In a striking passage later in the book, we are offered a performance of collectivity and connectivity that sharply contrasts with this earlier representation of pre-political virtuality, and it is the establishment of a common channel and code that is the transformational catalyst. A group of anti-racists confronts thugs and tormenters by standing and singing together:

So as the last car of the train went on down the middle of the street, every-

body was singing like church bells ringing up and down the grand canyon of the old Skid Row: Just like A treeeee Standing by The waterrr We Shall not Be Moooooved! The whole bunch of thugs made a big run at us sailing cuss words of a million filthy, low-down, ratty kind. Gritting their teeth and biting their cigar butts and frothing at the mouth. Everybody on our side kept singing. They made a dive to bust into our line. Everyone stood there singing as loud and as clear and as rough-sounding as a war factory hammering. (1968: 356)

Thus the machine that kills fascists is much more than the exterior ‘axe’ that is the acoustic guitar. Voices and bodies can meld and conjoin, too, forming a throbbing and propulsive ‘war machine’ (Deleuze and Guattari, 1987), a steely rhizome of sonic solidarity.

The performance of Guthrie’s ‘This Land is Your Land’ carries a similar affective weight. ‘All around me a voice is sounding’, when sung by a mass of people, is a ‘performative statement’ (Austin, 1962) – one hears and sings, and thereby propels into being, a collective voice. [6] Building on the work of Rick Altman (1992), sound scholar James Lastra (2000) has suggested that there is no such thing as an ‘original’ sound, because sounds always also include the material in which they resonate (e.g. a room, an open space), and materials are always experienced differently depending on one’s point of view. In other words, because we are all stuck in our own, individualised cages of audition, there can be no ‘original’ sound to speak of but only an endless variety of interpretations, of which sound *recordings* too can only ever be an interpretation or reading (Lastra, 2000). But Guthrie imagines a different kind of singing and hearing, whereby it is possible, if even for a moment, for everyone to hear and sing more or less the same thing. Sounds are indexical imprints, in Guthrie’s utopian model of sending and receiving; they are circuits that can wrap together ‘a gang of lost corpses’ into a collective agent. It is the diagrammatic machine called the Hootenanny that makes real this ‘impossible’ way of hearing and singing. ‘All around me, a voice was sounding.’

The Hootenanny was not just a machine of pure and undivided union, however, for the form constitutes a utopian voice marked by both solidarity and multiplicity. Obviously the harmony of group singing was a key feature of political folk performance (Roy, 2010), but variety and even conflict also marked the Hootenanny as practiced by the Almanacs and as taken up by *Broadside* and *Sing Out!* Both folksong magazines positioned themselves as purveyors of the tradition begun by the Almanacs, but both often emphasised their commitment to the publication of writers and singers whose views conflicted with those of their editorial boards. As issue no. 2 of *Broadside* declaimed: ‘Our policy is to let each songwriter speak freely – even though we may not freely agree with the sentiments expressed – and let each song cut its own trail’ (*Broadside*, 1962: 7). Thus the Hootenanny

form, which was indeed translatable from performance to print, involved both solidarity and multiplicity. Indeed, you might have to sing along to something you do not like. To do so, for the folkies, seemed important in and of itself.

Smule Apps

We turn now to some of the revival's unlikely heirs. Jeff Smith and Dr. Ge Wang founded the mobile apps developer Smule in 2008. Their objectives hearken back to the participatory and DIY ethos of the long American folk revival, which, starting with the small Hootenannies at the Almanac House's basement, tried to encourage the whole world to sing. According to the company's homepage:

Smule's mission is to connect the world through music. With the premise that everyone is creative, Smule uses the magic of technology to liberate the expressive musician in everyone. Smule's award-winning applications include Magic Piano™, I Am T-Pain™, and Ocarina. (Smule, 2012a)

Anyone can sing or play music. At least, we should all try. Indeed, with Smule software and iPhone in hand, many have done just that, for as of January 2013 Smule claimed to have 15 million active users (Caplan, 2013). The revival's mimeographed publications like *Sing Out!* and *Broadside* tried to make folk knowledge accessible (the magazines offered sparse chord charts for the most recent batch of topical songs, and often published the compositions of amateurs and unknowns), but Smule goes one step further by eliminating technique insofar as it is possible to do so without compromising the feelings of expressivity and virtuosity that can come from playing music. As Anthony Ha (2012) has described Wang's vision: 'When someone opens a Smule app, he says they shouldn't ask themselves, "Am I a musician?" because the answer is usually no. Instead, the goal is to draw people in, then by the time they realise they're making music, "it's too late – they're already having fun."'

Indeed, their programs are responsive and intuitive. The *Ocarina* and *Ocarina 2* apps turn your phone into something akin to a medieval pipe. The user blows into the microphone, directing the pitch by pressing various combinations of fingerings on a four-button touchpad. *Magic Piano* works similarly but with obvious differences in sound samples and interface. The user touches falling notes on the screen (a cascading visual which matches the song's rhythm, not unlike musical games such as *Guitar Hero* or *Rock Band*) to recreate

the central melodies of well-known hits. And *Sing!* harnesses the voice, allowing you to sing along to contemporary chart-toppers, pop and rock classics, and even public domain 'folk' songs. Traditional numbers like 'Twinkle Twinkle Little Star' are free, but you need to pay to participate in the folk process of material such as Justin Bieber's 'Girlfriend'.

The clear expressivity of Smule apps hearkens back to certain aspects of the folk revival, but so too does the machine-like quality of some of the programs. *IAMTPAIN*,* *Songify*, and *Autorap** all deploy the encoding device 'Autotune', which has increasingly been used since the late nineties to foreground the digital ground of contemporary popular music. [7] Users can record observational monologue or improvisational singing (you could even recite Guthrie lyrics), and *IAMTPAIN*, *Songify*, or *Autorap* will carve up and manipulate the recorded speech or song into rhythmically and harmonically pleasing (and often humorous) music, foregrounding the computational motor of the process. A new app called *Mad Pad* even blends this recombinant mashup aesthetic with the art of field recording as pioneered by Alan Lomax: 'Remix your life with MadPad! Turn everyday sights and sounds like your car, an empty soda can, or your friends into the ultimate percussive instrument. Who would have thought everyday life could be so musical?' (Smule, 2012b). Field recordings become samples to be remixed at the discretion of the folklorist-cum-deejay. Guthrie sang like a car, echoing the delirious proclamations of Tomas Marinetti and other Futurists but from within a Marxist framework, and Smule's folk revival also allows us both to sing into, and as, the machine.

In addition to sound and feel, though, a key connection between the Hootenannies and Smule apps are the latter's various sharing functions. *Ocarina* allows you to drop in on anyone on the planet currently logged in and jamming in real time. You are given a visualisation of their current location, and also the opportunity to 'love' their performance, which is as easy as clicking on a heart-shaped icon. The accumulated total of 'love' is then tabulated and displayed. On the theme of 'social' music, Wang boasts of the revolutionary potentialities of his instrument:

We use location to geo-tag people who have recently played the Ocarina; we can actually send that anonymously to the Smule cloud, as it were, and it's the first instrument that we know of in history that allows its players to hear one another from around the world. ... We believe this is just the beginning of a new revolution, where people will relate to one another differently and people will express themselves differently, all facilitated by what we can do on this device. (in Kirn, 2009)

And more recent Smule apps do not just allow you to toot your own horn or merely admire the tooting of others; you can now play with other anonymous folk through collaborative cloud networks. *Sing Karaoke*, for instance, allows multiple vocalists each to contribute a line or even just a phrase to their favourite tune, and the collaborative product can then be enjoyed and shared by all. On Smule's Facebook page, where an enthusiastic virtual community gathers to like and respond to recent promotions and contests, users have shared and commented on *Sing!* recordings featuring up to twenty collaborators. Each individual contribution recorded on the way to work, perhaps, in bedrooms, at recess: 'All around me, [voices] sounding.'

As we have begun to see, there are obvious echoes of the Hootenanny in the music-making mobile software of Smule. But Pete Seeger's (1972: 149) observation, 'our planet is full of singing people', was for Seeger an implicitly political remark. To reclaim individual and collective voices would be to reject the 'phoniness' churned out by the military-industrial-entertainment complex. Smule apps might seem to rekindle the promise of the original Hootenannies, at which distinctions between observer and participant were cast off, but we will now consider a few different ways in which Smule apps are an effect rather than a revolutionary cause – an articulation of a relatively new form of work, and of the degradation of political culture, in the era of 'cognitive' capitalism.

Composition or Repetition?

In his book *Noise*, political economist Jacques Attali (1985) explores the overdetermined relationship between our historical understandings of music and noise, on one hand, and social and economic change and revolution, on the other. Music for Attali is not just a reflection of particular socio-economic forces, though it is in some senses that as well; music – and more importantly, what a musical culture excludes as *noise** – *also signals towards new social potentialities*. The emergent bourgeois notion of the hermetically sealed work helped to prepare the ground from which the ancient regime would eventually be toppled (Attali, 1985). And the 'stockpiling' of labour time in the twentieth century, which is how Attali figures sound recording, pushed capital towards new horizons of surveillance and commodification (Attali, 1985). The concluding and ambiguously utopian chapter explores what Attali terms the age of 'composition', which he describes as:

Doing solely for the sake of doing, without trying artificially to recreate the old codes in order to reinsert communication into them. Inventing new codes, inventing the message at the same time as the language. Playing for one's own pleasure, which alone can create the conditions for new communication.
(1985: 134)

We might be reminded of Smule apps and the ‘YouTube folk revival’ in general when we read Attali’s utopian prognosis. Although self-branding and promotional culture pervade social networking sites and platforms like Facebook, Twitter, LinkedIn, or Academia.edu (see Hearn, 2008), many of Smule’s virtual communities seem to be forums of anonymous folk creation. Faceless flutists and singers going by the names of prem, fatsausage, pimpflute, Link, (anonymous), montreal, Marco, Emelie, PBMike15, sword, Thanatos, unicorngiggle, RIPLeRoiMoore, and PressTheHeart are just a few of the nodes that cut across this rhizome. They do not seem to be playing for recognition, but because they enjoy being creative for its own sake, or ‘doing for the sake of doing.’

But the hardware underneath the magical music-making *Ocarina* and its phylum-mates is always ready for more than ‘composition’: iPhones are only ever a swipe or a click away from becoming once again the tethering gateways to a 24/7 ‘immaterial’ (Lazzarato, 1996) workplace, as some neo-Marxist scholars have described it. [8] As the modern disciplinary boundaries between factory and home, public and private erode, exploitation reaches beyond the assembly line to subsume virtually all corners of social life (Dyer-Witheford, 1999; Hardt and Negri, 2000; Lazzarato, 1996). Franco ‘Bifo’ Berardi (2009) has aptly described this confluence of exploitation and creativity with his term ‘cognitariat’, and mobile communications are important vectors across which cognitariat subjects generate and share the affects and knowledges captured by cognitive capitalism:

Labor is the cellular activity where the network activates an endless recombination. Cellular phones are the instruments making this recombination possible. Every info-worker has the capacity to elaborate a specific semiotic segment that must meet and match innumerable other semiotic fragments in order to compose the frame of a combinatory entity that is info-commodity, Semio-capital. (Berardi, 2009: 89)

From this angle, Smule apps appear as merely the folksy mask of the larger mobile interface keeping us in constant contact to the endless streams of data many are required to sort through in order to be valuable contributors on the informational labour market. Guthrie’s machine killed fascists, and Seeger’s surrounded hate and forced it to surrender. Now the mobile, individualised pods carrying *Ocarina* and *Sing!* circulate value-generating affects, symbols, codes, and communication.

These instruments are not only happy distractions to keep flexible immaterial labourers amused in between calls or jobs. Like many applications and platforms that make up Web 2.0, Smule apps can also be considered as sites of value extraction. As Christian Fuchs

(2010: 48) puts it, '[c]apitalist produsage is an extreme form of exploitation of labour that the producers perform completely for free', and the uncountable hours anonymous users have spent building and sustaining Smule's network would be an example of the 'producer' exploitation Fuchs describes. [9] As the Smule privacy agreement makes plain:

Smule shares demographic, profile and other general information about you and our other customers with our partners on an aggregate basis. This means that we tell our advertisers general information about the characteristics of our customer base. ... Smule may share your unique device ID with advertisers or your location (based on opt-in location-based services, which rely upon a device's GPS coordinates). (Smule, 2012c)

Smule apps are part of the broader cultural industry of social networking, where creativity, communication, and collaboration are all surveyed and mined for aggregate data. The song collectors John and Alan Lomax shared in Leadbelly's copyrights, and took two thirds of his haul at concerts (Filene, 2000; Miller, 2010). Thus Smule participates in a long tradition of American song collectors' exploitation of the folk.

The Politics of the Chorus

We could say that the Almanacs' Hootenannies actually anticipated the contemporary 'prosumer': the audience was expected both to pay and to sing along, to plug into a participatory network and derive pleasure both from the network itself and from their own contribution. And, again, both the Hootenanny and the iPod share similar etymologies. But clearer differences emerge when we go back to the idea of singing as a diagrammatic machine, for the Hootenanny and Smule apps constitute materialisations of very different utopian visions.

In *Democracy and Other Neoliberal Fantasies*, Jodi Dean (2009: 2) describes 'communicative capitalism' as 'the materialization of ideals of inclusion and participation in information, entertainment, and communication technologies in ways that capture resistance and intensify global capitalism'. Of particular interest is Dean's (2009) discussion of technological fetishism and the transition of communication from the sending of messages (with destinations) to the endless circulation of 'contributions'. Political action is as easy as pointing and clicking, liking and sharing, but these activities are harnessed by capital and in turn reconsolidate the grip of neoliberal policies, according to Dean. As

Geert Lovink (2011: 7) more simply puts it in his similarly sobering account of social media: 'When everyone broadcasts, no one is listening.'

Eavesdropping on a live jam by an *Ocarina* user nicely highlights some of the claims Dean makes. We are confronted with a clean, pixelated image of planet Earth. Glowing in the background are all the other active users, tiny dots scattered across the planet; we audition one performer at a time, whose live musical expressions are visualised as waving streams (think *Ghostbusters*) shot straight out through the atmosphere and into space. Yet, the colourful stream of 'social' music emitted by each *Ocarina* player is not intended for the other nodes in this strangely solipsistic network, it seems, or even for the eavesdropper. (*Ocarina 2* has removed the other nodes from view entirely.) Its target is the process of contributing as such, and in the visual representation of this folk machine we see the peculiar synthesis that is networked communication and narcissistic individualism. 'All around me, voices sounding / Away from each other / *Directly up into outer space!*' *Ocarina* players are hyper-connected to an online community boasting 15 million users: a virtual Hootenanny to end all Hootenannies. But it is not possible for their broadcasts to take root, which is the ideal end of the folk process, according to Seeger and Guthrie. It is not possible for their broadcasts to be translated into other forms of embodied solidarity, which the program itself fascinatingly narrates. *Ocarina* players' contributions are by and for the medium – folksongs by and for spectacle.

Conclusion

This essay has explored the echoes of one particular performance model, the Hootenanny, in contemporary digital culture. The dream of a non-hierarchical space in which each voice maintains its individual integrity but is simultaneously able to meld as one with the whole remains a potent one in the twenty-first century. And yet, we can see its articulation take on varying forms, with varying kinds of baggage. Apple iPhones, and Smule apps in particular, borrow many of the aesthetic features of the Hootenanny. Pete Seeger's (1972: 149) claim that 'our planet is full of singing people' is perhaps the central theme of these devices. The question of solidarity, however, is cast aside in this most recent round of DIY revivalism, and these instruments even seem to make passivity and narcissism a part of their very design and aesthetic.

But this paper could have ended differently. The People's Microphone phenomenon, for instance, a focal point of the Occupy Movement, offers perhaps another example of the Hootenanny's continued relevance. Pete Seeger even stopped by Zuccotti Park to take

a turn. After he prodded the People's Mic to collectively hush itself, he fed into it 'The River That Runs Both Ways', an environmentalist song but also perhaps a metaphor for participatory media. Running both ways like Seeger's river, singers and speakers plugged their voices together in Zuccoti Park and around the world, melding distinctions between self and other at the same time that they lent their selves to the hybrid transmission of dissent (King, 2012; Ruby 2012), which has a destination.

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Biographical Note

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Notes

[1] Fans of digital media have done just as much to perpetuate such claims. The influential media scholar Henry Jenkins exemplifies this discourse when he writes: 'To create is much more fun and meaningful if you can share what you can create with others and the web, built for collaboration within the scientific community, provides an infrastructure for sharing things average Americans are making in their rec rooms. Once you have a reliable system of distribution, folk culture production begins to flourish again overnight' (2006: 136). Following the zeitgeist, folklorists have become interested in digital media as folk channels as well. *Journal of American Folklore* has recently begun to publish work on video games and net culture as objects of folklore: Kiri Miller (2008) has explored the folkloristic

qualities of the game *Grand Theft Auto*, and Robert Glenn Howard (2008) has pondered the vernacular aspects of digital networks, taking blogging as a case study.

[2] Although they do not spend time on the folk revival, Fred Turner (2006) and Thomas Streeter (2011) have probed deep connections between digital culture and both countercultural and Romantic utopianisms – and thus the histories they chart overlap with parts of the territory I am working.

[3] According to Apple folklore, the ‘pod’ in ‘iPod’ was inspired by Stanley Kubrick’s *2001: A Space Odyssey* (which in its time also expressed an anti-IBM theme). But one of pod’s archaic meanings is ‘the socket of a brace into which the end of a bit is inserted’ (*Oxford English Dictionary*). Fascinatingly, Gordon Friesen’s recollection of the original usage of ‘Hootenanny’ points in a similar direction: ‘Hootenanny had been in use in rural America from way back to designate something you didn’t know the exact name of. Say, for example, a couple of farm boys in Oklahoma might be overhauling a “T-bone Ford” out behind the barn with pieces spread all around, and in fitting them back together one might say to the other, “that thing-a-ma-jig goes here and that hootenanny goes there”’ (Cunningham and Friesen, 1999: 211).

[4] Ronald Cohen’s (2002) comprehensive and excellent history of the American folk revival highlights the importance of mass-media gatekeepers in this cultural field, though media-theoretical questions are not pursued. See also Svec (2013) for a reading of influential American folklorist Alan Lomax and his mediated conceptions of ‘the folk’, a case study that illuminates the folk revival’s sensitivity to media as such.

[5] Although he does not discuss ‘Car Song’, Cantwell (1996: 144) identifies the importance of the car in the Almanac Singers’ work and image: ‘The most important instrument in this effort was the automobile—the Almanacs travelled in a ‘31 Buick—and after it the portable recording machine.’

[6] I am indebted here to Hoday King’s (2012) article on the People’s Microphone of Occupy, which he interprets using Austin.

[7] The technology behind Autotune has a fascinating source in the military-industrial complex, in particular in the oil industry, as Dave Tompkins’s (2010) history of the vocoder

has recently highlighted. Jonathan Sterne (2013) has also recently presented work on this strange history.

[8] Vince Manzerolle (2013) has also recently explored the complex dynamics of mobile 'smart' phones in the post-Fordist workplace.

[9] Fuchs is pointing to the term 'prosumer', which was coined by the futurist Alvin Toffler (1981).

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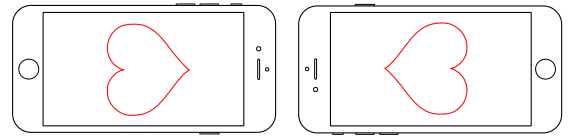
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FCJ-184 Interpassive User: Complicity and the Returns of Cybernetics

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Abstract:

This essay discusses the notions of “extension” and “prosthesis” as two different logics and modes of being with technology. I trace the two terms to the work of Marshall McLuhan, influenced by the work of Norbert Wiener and Buckminster Fuller. I argue that the logic of softwarisation (Manovich, 2013) is similar to the logic of extension, while the logic of appification (IDC, 2010) is similar to that of prosthesis. I argue that these logics also map onto the logics of metonymy and metaphor. I explain why such a distinction is useful for reading mobile apps and the computing practices they enable. I conclude by raising questions about users’ complicity within the bio-technological cybernetic assemblage: What does the user of these technologies want? Is she able to confront her desire through their use? Why is the demanding swarm of parasitic ‘media species’, such as apps, so determined to get under the user’s skin?

...cybernetics gets more and more complicated, makes a chain, then a network. Yet it is founded on the theft of information, quite a simple thing.

Michel Serres, The Parasite (2007: 37).

No boundaries

This essay explores the properties of mobile apps – and ‘smart’ technologies in general – that return us to the allegedly ‘old’ questions of governance and control raised by cybernetic theory. I argue that mobile apps are different from other software due to the role they play in transforming the configuration of actors in the human-machine assemblage. The significance of such radical reconfiguration is veiled by the discourses of ‘innovation,’ ‘creativity,’ ‘sustainability,’ ‘productivity,’ and ‘transparency,’ which advocate the extensive use of cloud based technology for the sake of generating more data. This results in an environment where ‘the body-across-platforms as the body with the data’ becomes ‘the body as the data it produces’ [1]. The body-across-platforms acquires the property of programmability when the users ‘actively participate in staging the scene of [their] own passive submission – and ... view such participation as a form of power sharing’ (Andrejevic, 2007: 15). Slavoj Žižek identifies this as a relation of “interpassivity” (1999: 102–124) – a forced pretense of being passive, while actually being frantically engaged in the production of data. In this context, I suggest that mobile apps as elements of cloud computing are a “media species” [2] unlike other software; they impose a kind of “totalitarian interactivity”, as Lev Manovich described it in 1996, which manipulates users by imposing on them its demand for attention, dedication, and complicity to and with the machinic network 24/7.

The interpassive relation with technology is based on the logic of “prosthesis”, which can be distinguished from the logic of “extension”. They are different modalities or configurations of possibilities, impossibilities, contingences and necessities of being with technology. I argue that the distinction between these two logics and modalities, developed by Marshall McLuhan, whose theories of technology as “the extensions of man” was adapted by media theory, can be made explicit in the context of cybernetics, which conceives the two modalities as continuously and mutually transforming in how they work, in time, against any boundary whatsoever. And finally, I will explain why such a distinction is useful for reading mobile apps and the practices they enable for the production of the “data subject” (Bauman et al., 2014).

Networks of control

Researchers interested in exploring the boundaries between the technological and biological met and formed the Cybernetic Group at a series of meetings in New York City between 1946 and 1953. These meetings, called the Macy conferences, generally all had the same title and theme, 'Cybernetics: Circular Causal and Feedback Mechanisms in Biological and Social Systems.' The conferences brought together a variety of scientists to explore such topics as information theory, analogies between organisms and machines, teleological mechanisms in society, collaboration between physics and psychology, intelligibility in speech communications, homeostasis and learning, decision theory, and many others. [3] The central focus of cybernetics as it emerged from these conferences was the study of processes within complex systems of servomechanisms, adaptive mechanisms, or automata, either 'in the metal or in the flesh' (Wiener, 1961: 42), that are capable of self-regulation by means of negative feedback in order to retain equilibrium. Through the long history of its developments, [4] cybernetic thought has conceived of self-regulating systems as 'coupled to the outside world both for the reception of impressions and for the performance of actions.' These systems 'contain sense organs, effectors, and the equivalent of a nervous system to integrate the transfer of information from one to another' (Wiener, 1961: 43).

Self-regulating systems cannot be thought without the notion of "network" that enables the feedback and transmission of information between automata and the environment or between different systems. In *What Is Cybernetics?* (1954), French topologist George T. Guilbaud, who was one of the first theorists to introduce the notion of "network" in the discussion of cybernetics, clarifies that the network of relations, or 'the pattern of interwoven connections,' has been of the primary concern for cyberneticians:

"Network" here is at once a metaphor and more than a metaphor. ... In a system of cells or boxes interconnected by pathways, it is possible, as in the case of the simplest of schemas – family tree – that there may never be more than one way of going from one cell to another, so that in order to return to the starting-point we have to retrace our path. There are thus no closed circuits, and the "network" scarcely deserves the name. But as soon as the schema becomes more complicated, closed circuits (also termed "loops" or "meshes") make their appearance. The presence of such loops in the schema of a servo-mechanism is quite fundamental; it is from them that "reflex" and "reactive" structures are formed. (1961 [1954]: 15, 17)

The notions of “feedback” and “communication” between self-regulating systems imply that these systems are networked. This complicates the understanding of boundaries between complex systems, which can now be thought of as either porous or imaginary. This is where a “network” is no longer simply a metaphorical figure of thought, but becomes a metonymical relation of systems that insists on their material contiguity (in space) and continuity (in time).

Such a model of a complex mesh or network materialised a decade later, in 1964, when American electrical engineer Paul Baran invented a packet switching technology designed for transmitting fragmented messages through the best available nodes of a distributed network. This distributed structure, different from centralised and decentralised networks, soon became a model for the ARPANET, the first large wide-area communication network established by the U.S. Department of Defence in 1969. This distributed structure of regulated communication expressed ‘a distinctly cybernetic notion of design’ (Pickering, 2011: 32). As Andrew Pickering explains, unlike the usual notion of design, which privileges theory and:

... entails the formulation of a plan which is then imposed upon matter ... the cybernetic approach entails ... a continuing interaction with materials, human and nonhuman, to explore what might be achieved – what one might call an evolutionary approach to design, that necessarily entails a degree of respect for the other. (2011: 32) [5]

This decidedly optimistic description, however, does not deny the possibility of distributed control on the micro-level (which the notion of “regulation” implies) and, as such, cybernetics remains a way of subsuming ‘the other’ to the system.

Spatially, the cybernetic communicational network has spread, at first, through the United States and later, across the globe, gradually creating a smooth area of regulated communication through the micro-management of information flows. Luciana Parisi, in *Contagious Architecture*, provides an example of the subsumption of ‘the other’ by the system, noting that the neoliberal space is ‘defined by the (networking) movement of people,’

The space of the urban and the space of business thus become isomorphic, as they are mediated by an invariant function that establishes a topological connectedness driven by local interactions. It has been argued that this fusion between architectural space and

the space of the market – this “movement-space” that has joined them together into a decentralized neoliberal managing of subjectivity – only affirms “the generalization of the market form itself.” In other words, contemporary architecture and design have been accused of adopting the philosophical and critical conceptions of space, and in particular the smooth space of control, to the operations of the neoliberal market, the ontological being of which has come to engulf all forms of aesthetics, culture, and technology. (2013: 160)

Temporally, the distributed structure of regulated communication has established a new relation between the past, present, and the future based on the idea of the recordable and retrievable past and of the pre-mediated (Grusin, 2010), predictable and pre-planned by our apps future – a smooth temporality of the now where we live a life ‘on the record’ that is ubiquitously stored by machines without our consent. As Rob Coley and Dean Lockwood write, capitalism ‘deteritorializes, renders fluid, unleashes desire’, ‘but only to record, to regulate, to sort, sieve, anticipate and modulate [it] by virtue of the technology of control’ (2012: 23). Christopher Nolan’s film *Inception* (2010) about ‘a team of professional corporate thieves’ exploring the possibilities of ‘extracting lucrative industrial information from their targets’ subconscious minds as they sleep,’ provides a potent metaphor for “cloud time”: ‘the inception of the future’ (Coley and Lockwood, 2012: 3). This is George Orwell’s *Nineteen Eighty-Four*: ‘Who controls the past controls the future; who controls the present controls the past’, with a new twist: ... who controls the future controls the present.

Planetary traffic

Shortly after Baran’s invention of the message transmission via a distributed network, ‘man’s movement [was linked] to his communication’, [6] marking the ‘move from a mechanical to an electronic environment’ (Wigley, 2006: 385). As Mark Wigley (2006) points out in ‘Network Fever’, these topics became the subject of Greek architect Constantinos Doxiadis’ annual Delos Symposia of Ekistics held on board his yacht New Hellas from the early 1960s until the mid 1970s. During these meetings, renowned architects, biologists, archaeologists, engineers, linguists, geneticists, psychologists, psychiatrists, anthropologists, along with musicians, literary scholars, historians and philosophers gathered to discuss the future of human dwelling. Doxiadis defined Ekistics as the study of a ‘universal settlement’ in the form of ‘a worldwide city, threatened by its own torrential expansion’ (1963). He believed such a city would be constituted by a constellation of the connected ‘units of space’, and, as such, would form a complex ‘system of Networks, physical and managerial, by which our society operates’ (Ekistics, 1969). The ‘relationship of the units of space’ would condition ‘to a great extent the relationship

between people' (Ekistics, 1968) in that it would teach them to associate their need for connectedness with a certain technological design, be it a system of dwelling or a mobile network.

Rethinking the notion of a "network" of dwelling in terms of circulation and traffic actually began several decades prior to the Delos symposium, during the fourth Congrès internationaux d'architecture modern (CIAM) held in Moscow in 1933. The floating Delos symposium was modelled upon the CIAM, and picked up its concerns in the 1960s. It was McLuhan who took 'the CIAM argument in the direction of electronics' by announcing 'on the second morning of the first Delos boat trip that electronics presents new challenges to planners because this latest prosthetic extension of the body defines an entirely new form of space' (Wigley, 2006: 382, 383). In the setting of that floating conference, on July 6, 1963, McLuhan met his long time inspirational figure, from whom he borrowed the notion of "prosthetic extension," American neo-futuristic architect, inventor, and systems theorist Buckminster Fuller. In his illuminating discussion of the Delos conferences, Wigley describes this meeting of 'a short man in dark pants, close-fitting white jacket, crisp shirt, and tie with a tall man in light pants and a loose-fitting summer shirt covered with a geometric pattern' as the historic moment that began 'the radical confusion of architecture and networks' (2006: 377, 376). [7]

Both Fuller and McLuhan spoke of prosthetics in their work. McLuhan was influenced by Fuller's *Nine Chains to the Moon* (1938), in which Fuller described technology as an extension of the body and 'had been insisting that traditional architecture had to give way to a "world wide dwelling services network" modeled on the telephone network'. Here, he 'visualized global electronic networks long before they arrived' (Wigley, 2006: 376). Passionately engaged with the interdisciplinary discussions during the Delos symposium, McLuhan was eager to develop this notion of prosthetics even further. As Wigley writes,

*...the boat became an amplifier for his argument that electronics is actually biological, an organic system with particular effects. The evolution of technology is the evolution of the human body. Networks of communication, like any technology, are prosthetic extensions of the body. They are new body parts and constitute a new organism, a new spatial system, a new architecture. This image of prosthetics – which McLuhan had first presented a year earlier in *The Gutenberg Galaxy* and was busy elaborating for *Understanding Media: The Extensions of Man*, which would launch him to superstardom when it came out a year later – was now reframed as an architectural image. (2006: 376)*

Indeed, in *Understanding Media*, McLuhan specifies the technological enhancement of various human capacities: he defines the written word as ‘an eye for an ear’, clothing as ‘our extended skin’, clocks as producing ‘the scent of time’, and the telegraph as ‘the social hormone’. In the last chapter of the book he arrives at a cybernetic scenario of automation based on continuous exchanges between human and machine facilitated by their extensions. McLuhan explores the meanings of such relations, thereby expressing a non-static view of technology. Take, for example, the passage from his essay ‘The Gadget Lover’, where he writes:

Physiologically, man in the normal use of technology (or his variously extended body) is perpetually modified by it and in turn finds ever new ways of modifying his technology. Man becomes, as it were, the sex organ of the machine world, as the bee of the plant world, enabling it to fecundate and to evolve ever new forms. The machine world reciprocates man's love by expediting his wishes and desires, namely, in providing him with wealth. (McLuhan, 1995 [1964]: 46)

This description seems more than apt today, when we constantly feed data to our machines that subsequently ‘learn’ our preferences, search our requests and ‘memorise’ the patterns of our online activity in order to improve their algorithmic responses and, thereby, pass as ‘intuitive’, ‘intelligent’ or simply, ‘friendly’ to their users.

McLuhan’s vision of the technologically enhanced, or networked, user dovetails with the cybernetic conception of the world as a regulatory machine on a planetary scale. ‘Because of this, cybernetics is often credited with inaugurating a particular historical relationship between subject and world,’ Alexander Galloway writes; ‘specifically, cybernetics refashions the world as a system and refashions the subject as an agent’ (2014: 113). As we know, the agent in the cybernetic system does not need to be a human but can also be a machine or an animal. And it was cybernetic thought, with its notion of “cybernetic synthesis” that opened up the way to think of each of these ‘agents’ in terms of another. As David Mindell points out, the notion of “synthesis” is at the foundation of Wiener’s theory of ‘communication in the animal and the machine’. Wiener argued that ‘human behavior and dynamic mechanisms operated according to similar principles’ and, thereby ‘posited the analogy between the digital computer ... and the human nervous system’, which he called ‘a new science of feedback’ (2002: 4). Within this new science, any kind of agent can be exploited, even a machine; the human agent, however, is not simply being exploited, deceived or manipulated, but overtly allows for such exploitation, deception and manipulation to happen by being complicit with the system, or systems, of intelligent machines.

Complicity across platforms

In the scholarship from media and technology studies to posthumanism, the line between “extension” and “prosthesis” has always been rather blurry and a clear distinction between them has never been made. In this essay I argue that the concepts of extension and prosthesis are two modalities of being with technology, and I use these concepts to highlight the difference between mobile apps and other software. At the same time, I suggest two parallel ways of distinguishing between these two modalities by reading the difference between them as the difference between 1.) metonymy and metaphor and 2.) surplus and lack.

	two parallel ways of differentiating	
modalities	1	2
extension (other software)	metonymy	surplus
prosthesis (mobile apps)	metaphor	lack
production	body-across-platforms	complicit subject

As I have suggested, the modalities of extension and prosthesis are logically different. The notion of extension is governed by the logic of metonymy that implies contiguity, but the logic of prosthesis is governed by the logic of metaphor. Metonymy and metaphor are both sustained by the law of substitution: while metonymy is a substitution of a part for a whole, metaphor is a substitution on the basis of resemblance.

This understanding allows us to speak about the production of the body-across-platforms that becomes a platform itself. As Marc Andreessen conceives it, a platform is ‘a system that can be reprogrammed’ and customised in order to adapt ‘to countless needs and niches that the platform’s original developers could not have possibly contemplated’. This implies its essential programmability: ‘If you can program it, then it’s a platform. If you can’t, then it’s not’. [8] The logic of “softwarization” (Manovich, 2013) is the logic of extension; while the logic of “appification” (IDC, 2010) [9] is that of prosthesis. The former is also the logic of metonymy and it implies contiguity as the adjacency of different entities; the latter is the logic of metaphor and it is based on the laws of discontinuity and substitution on the basis of resemblance. Yet neither the case of extension and prosthesis, nor that of softwarization and appification, constitute stable oppositions.

The modality of extension implies an ‘addition’ of something ‘extra’ in order to extend the body or enhance a certain physical or mental capacity. Extended, the body is ‘more than itself.’ Such a description could be quite problematic if we treat the body prior to extension as original or normal. However, the body is always in continuous transformation; it either absorbs or rejects, but only to absorb something else again. An ‘original’ form does not exist. The body is not insensitive to extensions or ‘surpluses’ however; addiction is a constant risk. From here we can make a connection with the psychopathology of the prosthesis that often accompanies the move from prosthesis as a surplus to this surplus’ constitution of a lack. This is described in the psychoanalytic reading of the addiction to technology. As Luca Bosetti notes, ‘the words “addiction” and “prosthesis” have a very similar meaning’. He continues:

Theorists of addiction point out that the term “addiction” comes from the Latin ad-dictum and is linked to the terms ‘edicts’ that originally designated a new law added to the juridical body, and then came to designate the juridical act that assigns a person or a thing to the will of another. Theorists of the posthuman, on the other hand, remind us that the term prosthesis comes from the Greek pro and thesis and literally also means ‘addiction’, although originally it had a grammatical, rather than medical, meaning in English and referred to the addition of a syllable at the beginning of a word and not to a replacement for a part of the body. Both addiction and prosthesis, therefore, refer to something that is added. Moreover, ... these definitions show that prosthesis and addiction originally also both referred not – as they currently do – to something that is added to the body, but to something that is added to signification, to the signifier of the law in the case of addiction and to the signifier as such in the case of the grammatical prosthesis. (2010: 411)

For the reasons such as these, there is often an absence of a clear distinction between the two modalities of being with technology – extension and prosthesis. Indeed there are constant reversals from one mode to another. This is not a coincidence and can be traced to the foundations of cybernetic thought. At the same time, the two terms are not interchangeable in the works of early cyberneticians but, rather, designate a certain degree of difference or alteration observable in the object, either due to processes of interaction with the outside world or to certain internal developments.

A user engaged with what is now a global network managed by ‘smart’ technologies often has her experience configured for her in the modality, on the one hand, of an extension; her devices are fashioned as useful and empowering additions, for example, when it comes to managing multiple daily tasks, organising a big research project, or maintaining social or

communal exchanges. On the other hand, this modality leads towards the modality of the prosthesis. It does so in further reification and alienation of users by leaving them no other option but the engagement with machines for the sake of data production which increases the virtualisation of labour. Today, it is a common knowledge that the performance of the human-machine 'collaboration' is only optimised when the relation between them tends towards the prosthetic modality. When the elements of the assemblage synchronise and merge, their systems become analogous and they enter the regime of co-dependency: when the matter is informational, as Patricia Clough insists, [10] both the information machine and the human find themselves in need of each other.

Here, alongside the production of the body-across-platforms, need constitutes the production of the complicit subject.[11] Both productions, the body-across-platforms and the complicit subject, are important for my discussion of the difference between softwarization and appification as a topological relation between the modalities of extension and prosthesis. The body-across-platforms is a volatile formation that is constantly being subjected to measurement and surveillance. The complicit subject is lodged in the inexistent realm between the surplus and the lack, always in never ending labour, re-producing itself as a gap.

Prosthetic extension

The two modalities are in the process of continuous transformation in how they work, in time, against any boundary whatsoever – just as such a transformative relation was conceived by cybernetics. Thus, the lack of the distinction between them is not a coincidence; it's a programmed omission. Let us look at Wiener. In the introduction to *Cybernetics*, he outlines the practical benefits of cybernetic ideas in different areas, and 'one of these is the matter of prosthesis for lost or paralyzed limbs' (Wiener, 1961: 25). He writes:

The loss of a segment of limb implies not only the loss of the purely passive support of the missing segment or its value as mechanical extension of the stump, and the loss of the contractile power of its muscles, but implies as well the loss of all cutaneous and kinesthetic sensations originating in it. The first two losses are what the artificial limb-maker now tries to replace. The third has so far been beyond his scope. (Wiener, 1961: 26).

Although it might seem that he uses both terms “prosthesis” and “extension” when referring to the same object, they designate different relations between the organic matter of the human body and the non-organic matter of the technological object. For Wiener, both prosthesis and extension are replacements or substitutions for loss. However, while an extension is a ‘passive’ or ‘mechanical’ support of the stump that may also have an aesthetic value and restore the imaginary consistency of the body, a prosthesis is cybernetic because it functions as ‘the replacement of lost senses’ (1961: 25). A cybernetic prosthesis is different to extension in that it merges with the organic tissue of the body and the nervous system by means of feedback; the information flow trespassing the boundaries of organic and non-organic matter. In this sense, although the prosthesis is still partly imaginary, it also presents the possibility for change or transgression of the imaginary body acquired at the ‘mirror stage,’ to use a Lacanian notion, which sometimes leads to original solutions for ‘virtualising’ and ‘remixing’ senses. Wiener writes: ‘The ideas of communication engineering have already been applied by McCullough to the problem of the replacement of lost senses,’ he writes, ‘in the construction of an instrument to enable the blind to read print by hearing’ (1961: 25). [12] With the cybernetic prosthesis when ‘data move across various kinds of interfaces, analogical relationships are the links that allow patterns to be preserved from one modality to another. As N. Katherine Hayles writes in *How We Became Posthuman*, ‘(a)nalogy is thus constituted as a universal exchange system that allows data to move across boundaries’ (Hayles, 1999: 98).

It is in this analogical reasoning of cybernetics that we find the origins of McLuhan’s theory of extensions. In ‘The Phantom Captain,’ a short story from Fuller’s book *Nine Chains to the Moon*, which McLuhan held in his hands when he met the author on Doxiadis’ yacht, there are several passages that anybody familiar with even a ‘basic McLuhan’ might recognise immediately. In one of the passages, Fuller writes that it has ‘been but a step from false adornment and artificial surface extensions of the human body, in the matter of clothing, to shelter; and from shelter to the myriad of tools and instruments that were rationally evolved at an earlier time by [man] in the extension of his own mechanism’ (1963 [1938]: 25). In another he writes: ‘Holding the full significance of this thought in mind, one can suddenly comprehend, ... that the automobiles ... are extensions of their drivers, just as are the drivers’ hats, coats, shoes and faces; it is the progression of boxes within boxes of childhood play’ (Fuller, 1963 [1938]: 28). In another example, Fuller reaches an astonishing conclusion about the ‘extended man’, whose ‘inner spirit’ or ‘consciousness’ he describes in a Cartesian manner as ‘the phantom captain’: ‘The thrilling inference of the phantom captaincy conception is that it not only precludes the possibility of the operation of extended machinery without the volition of inner man,’ Fuller writes, ‘but that the unit mechanisms are doing for man what politics has consistently failed to accomplish’ (1963 [1938]: 28–29). Without such captaincy Fuller maintains, man disintegrates.

Thus, McLuhan's term "prosthetic extension" is not a mere collision of two modalities, but, rather, points to the moment of their synchronisation, the moment when they become analogues and contiguous, although only temporarily. For McLuhan, the "message" means the change of scale that occurs as a cascade, or 'the progression of boxes within boxes', such as when old media become the content of new media and so on. Should not the same logic apply to "extension" and "prosthesis"? Every extension eventually becomes prosthetic, as the self-regulating system circulates between a surplus (extension) and a lack (prosthesis). McLuhan's "prosthetic extension" does not just simply maintain the agent's ubiquitous connection or relation with a self-regulatory and self-referential system, but sets the system up itself. A "system", he says, is the entire assemblage: 1.) Narcissus 2.) mesmerised by 3.) his reflection in 4.) the water:

This extension of himself by mirror numbed his perceptions until he became the servomechanism of his own extended or repeated image. ... He had adapted to his extension of himself and had become a closed system. ... men at once become fascinated by any extension of themselves in any material other than themselves. (McLuhan, 1995 [1964]: 41)

In other words, an extended man is the one who has locked himself out or, as McLuhan puts it, 'self-amputated' (1995: 42–43) from the world. Such a conception of a man and his extension is a reversal of Jacques Lacan's notion of the subject. For Lacan, the subject misrecognises a reflection in the mirror as the 'self,' which produces the split subject. In the words of Samo Tomšič, 'Prosthesis is the visibility of Splatung, the bodily split' (2012: 146); thus, the 'self' is a secondary imaginary creation that masks inconsistency and the split. For McLuhan, on the contrary, the 'self' seems to be initially present, but the engagement with media causes the substitution of the 'self' with an extension so that the 'self' gets detached or, 'amputated': 'the image produces a generalized numbness or shock that declines recognition. Self-amputation forbids self-recognition' (1995: 43). Despite the difference, both thinkers suggest technology traumatises, affects and deceives.

The human subject, a figure of recursion

When Jay David Bolter and Richard Grusin introduce the term "remediation", they also make a reference to McLuhan's notion of "extension" 'of the human sensorium' that 'can even be regarded as an anticipation of Donna Haraway's cyborg' (2000: 77) which, as above, also fulfils the logic of the prosthesis. Indeed, as I have argued above, if extension and prosthesis are two modalities of being with technology, they cannot be

simply opposed. Similarly, the cyborg and human cannot be simply opposed because these modalities co-exist topologically as two sides of one surface. Yet there are subtle differences between them. It is true that, over time, the cyborgian modality, when beset by misbalance and disturbance, strives for equilibrium by means of an extension that calms it down. Yet over time the prosthetic figure of the human constantly reemerges to unbalance the system all over again and to open it up for the next circuit towards change. McLuhan takes this on and suggests a move from cyborgisation (by an extension) to humanisation (by a prosthesis), not the other way around. This has to do with the recursive figure of human, or rather, the subject, from within the machinic self-regulating system.

It is true that McLuhan does not distinguish between the notions of “extension” and “prosthesis” because a distinction would imply an essential difference between the two, which he tries to avoid. Yet, especially in *Understanding Media*, he conceives “extension” and “prosthesis” as two different modalities, stages, or patterns of engagement with technology that differ both temporally and spatially. McLuhan’s ‘medium as the message’ is his way of conceptualising the transition of the extension towards the prosthesis: ‘What we are here ... are the psychic and social consequences of the designs or pattern as they amplify or accelerate existing processes’, he claims. ‘For the “message” of any medium or technology is the change of scale or pace or pattern that it introduces into human affairs’ (1995: 8). ‘The pressure of new burdens resulting from the acceleration by ... media [is] the immediate oscillation of the extension or “amputation” of this function from our bodies’, he writes (McLuhan, 1995: 42). A user ‘embraces’ the tool that substitutes a certain faculty or sense. This leads to a merging with technology or the production of a ‘closed system’ (McLuhan, 1995: 44). The ‘closure’ occurs where the extension turns into the prosthesis and, by oscillating between “human” and “cyborgian”, produces the interpassive subject of the machine.

In *Technology and the Canadian Mind: Innis / McLuhan / Grant*, Arthur Kroker describes McLuhan as ‘a technological humanist of the blood’:

...his conviction, repeated time and again, was that if we are to recover a new human possibility it will not be “outside” the technological experience, but must, of necessity, be “inside” the field of technology. What is really wagered in the struggle between the opposing tendencies towards domination and freedom in technology is that which is most personal, and intimate, to each individual: the blinding or revivification of ordinary human perception. (2001: 64)

I would only add to this incisive observation that McLuhan goes as far as to question the

very possibility of the “outside” of the technological experience’. If the world has become one in which the environment is equated with a network as an assemblage of externalised senses or an infrastructure of the interconnected ‘internet of things’, then either way this world is sustained by complex relations materialised as flows of information. As Kroker explains McLuhan:

It is the human destiny in the modern age to be programmed by an information order which operates on the basis of algorithmic and digital logic, and which, far from conscious human intervention, continues to move through the whirring of its own servomechanisms. ... By putting our physical bodies inside our extended nervous systems by means of electric media, we set up a dynamic by which all previous technologies that are mere extensions of hands and feet and teeth and bodily controls – all such extensions of our bodies, including cities – will be translated into information systems. (2001: 67)

But what is this ‘human destiny’ if not the programmability of the body-across-platforms, the condition that Fuller describes in his 1938 essay (from which McLuhan’s borrows the notion of “extension”): ‘[Man] may be likened to the variant of polarity dominance in our bipolar electric world which, when balanced and unit, vanishes as abstract unity of 1 and 0’ (1963: 19). McLuhan’s theory is often regarded as technologically deterministic (Williams, 1974), however, I agree with Kroker that McLuhan’s view of technology is more complex and ambiguous than the constraints of determinism would allow. When McLuhan’s work is taken in the context of wider cybernetic discourse, the human is configured as positive feedback, part of the machinic assemblage that drives it towards reproduction for the sake of change, not the preservation of the old forms (remember McLuhan’s ‘man becomes, as it were, the sex organ of the machine world, as the bee of the plant world, enabling it to fecundate and to evolve ever new form’ [1995: 46]).

Here I return to the difference between softwarization and appification. I suggest that software is more likely to be associated with the mode of extension. Thus, mobile apps operate according to the logic of prosthesis, not only due to their constant presence as an addition to a user, available to serve 24/7 but because they inevitably transform into preemptive generators of needs. While the extension is an addition; the prosthesis is an addiction. [13] Given this, we need to differentiate between users’ agency, i.e. as resistance or disobedience, and user activity facilitated by prosthetic technologies.

Reactionary activity

There is a way to argue that the agency the subject acquires in the cybernetic assemblage due to 'the production of singular subjectivities' is immediately taken away from her by 'the production of collective totalities' that absorb subjects: 'It acts out the fantasy of a Same that always manages to integrate the Other; as one cybernetician puts it, "all real integration is based on a prior differentiation"' (Tiqqun, 2001). This strategy is typical of neoliberal discourse; it interpolates subjects in such a way that everyone receives an "individualised" call for action, but, in reality, they are merely called to engage in the activity required of subjects by the system in order to sustain the system. Eugene Thacker makes a similar observation referring to the ideological deception in the time of ever "new" media: 'Activity is ... not as grandiose as "agency," because this term carries with it all the baggage of being interpolated as a certain kind of subject' (2008: 98). Activity here is a mere reaction, and not agency. Cybernetically speaking, 'Gordon Pask called this "it-referenced" interaction, because the controlling system treats the other like an "it" – the system receiving the poke cannot prevent the poke in the first place' (Dubberly et al., 2009). Thacker also differentiates between 'activity' and 'action' outside of the cybernetic model, by opposing the two notions on the basis of their significance or weight: 'The action marks an event, while activity just sort of goes on;' and yet, he concludes, 'activity is not quite so progressive as "interactivity"' (2008: 98).

While the concept of interactivity seems a response to the inadequacy of the binary opposition activity/passivity, there is little theoretical consensus about its meaning. When mobile apps are regarded as "interactive tools," what first comes to mind is a robust feedback loop where human and technology supply each other with the information necessary to launch several different, yet, interdependent processes. At least at their current stage of development, most mobile apps are still rather simple programs, compared to other software that runs (on) our computers. However, as a swarm of small fragments of application software, each oriented towards a particular task, mobile apps constitute a complex synchronised system of harvesting data that exceeds a first-order cybernetic model.

There is an ambiguity about apps. After the user agrees to grant the app the access to personal information stored on a phone or a tablet, such as GPS location tracking, photos and media files, camera and microphone, and Wi-Fi connection information, the app, attached to the user as their information source, initiates a process of reading the data of the user, for whom it delivers a solution in accordance with the app's declared purpose or goal. The attraction of apps is related to the creative way in which they use the limited number of technological functions and properties of mobile platforms. In this sense,

most apps still remain imaginary. [14] Manovich is right to point out, with a reference to Althusser's concept of "interpellation", that interactivity is a myth, since 'interactive media' simply ask us 'to follow pre-programed, objectively existing associations', 'to identify with someone's else mental structure' by mistaking 'the structure of somebody's else mind for our own' (2001: 61). [15] As such, apps are meant to trick – either the system or the user. At their best, to employ the MIT's slang-term from the 1970s, they are witty hacks. At their worst, apps are parasites.

Parasitic passivity

'The system constructed here beginning with a production, temporarily placed in a black box, is parasitic in a cascade', Michel Serres writes. 'One parasite (static), in the sense that information theory uses the word, chases another, in the anthropological sense', and he continues: 'The parasited one parasites the parasites' (2007: 5, 6, 13). The notion of "parasite" and the "abuse value" it carries is Serres' way to substitute the binary of activity / passivity with his own subversive 'universal' couple of the terms "host" and "guest". Here, both words correspond to one French word, *hôte*, so that the two meanings are present simultaneously and shared by both notions – active 'eater of all' is also passive as 'eaten by all' (2007: 26). According to Serres, the abuse value is primary: it precedes any other kind of value. The abuse value is a secret of the cybernetic system, in which it is 'covered up' with the notions of exchange, communication, and equilibrium. The parasite always moves in one direction and trespasses different strata of organic and non-organic, material and immaterial. The parasite does not confiscate: it sneaks and steals to relieve itself of obligations to return or barter for what it grabs while crawling. The parasite is sustained by theft.

For Coley and Lockwood, this theft constitutes the production of 'the body of the multitude,' despite Michael Hardt and Antonio Negri's insistence that a 'living social flesh ... is not a body' (2012: 52). It is this 'body of the multitude,' that the cloud turns into 'a technologically "smart" body, an intensified coalescence of a prosthetic, proximal body of nodal points'. The 'networked body of the social', being at the same time the host and the parasite, 'feeds off the monstrous body of capital while it, in turn, is nourished by that very body of the collective' (Coley and Lockwood, 2012: 52). For Matteo Pasquinelli, the figure of the 'immaterial parasite' within a distributed network refers to the system's hunt for material energy and economic surplus; it 'functions first as a spectacular device', he explains, 'simulating a fictional world, building a collaborative environment or simply providing communication channels, it accumulates energy through and in favour of its physical substratum' (2008: 672). It advocates and promotes user agency, but in reality

it facilitates a low key, ambivalent activity of ‘sharing’, ‘liking’, reposting, as ways of appreciating someone’s expression passively by mindless somnambulant clicking across the network void. The growing numbers of app downloads just within the last four years – from 300,000 downloaded applications in 2010 to 76.5 billion downloads in 2014 – is a result of the IT industry’s shift towards the so-called ‘Third Platform’, where the formerly independent forces of mobile computing, cloud computing, big data analytics and, of course, social media and networking now converge. [16] Apps are believed to perform the important task of managing our lives as personal organisers and interpersonal connectors. However, apps are part of the network infrastructure – especially with the arrival of the ‘Third Platform,’ the last interfacial layer between a user and the environment.

In his earlier reading of cyberspace, Slavoj Žižek discusses ‘the strange phenomenon of interpassivity, a phenomenon that is the exact obverse of “interactivity” in the sense of being active through another subject who does the job for me’ (1999: 104). The examples of such a phenomenon, he argues, do not necessarily belong to Internet culture, but can be found in different historical periods as well as in cultural and religious practices – from the Chorus in Greek tragedy to Akihiro Yokoi’s and Aki Maita’s Japanese digital pet-toy tamagochi to the Christian God the Father, whom Žižek describes as ‘the ultimate tamagochi’, produced by our unconscious and attacking us with endless requests and demands (1999: 108). Just like interactivity, Žižek argues, the notion of “interpassivity” subverts the standard opposition between activity and passivity, but in a twisted way: ‘if in interactivity..., I am passive while being active through another, in interpassivity, I am active while being passive through another’ (1999: 105). However, he emphasises that the interpassive “acting through” another masks the subject’s activity by making it invisible to the outside observer: one may look passive or disengaged, whereas in reality, ‘the subject is incessantly – frenetically even – active, while displacing on to another the fundamental passivity of his or her being’ (Žižek, 1999: 106). In the end, users’ ‘frenetic activity’ is a consequence and a symptom of what Geert Lovink (2011) defines as the ‘psychopathology of information overload’ – a condition describing the unstoppable urge to keep oneself ‘in a loop’ of constantly flowing updates, endlessly accumulating downloaded books, films and music, perpetually bookmarking numerous webpages instead of reading them – due to the lack of time and the pressure to keep up with the flow – and sharing them via social networks. These typical symptoms are far too familiar to nearly any user and are exploited within a 24/7 economy fuelled by user-generated content – and data-mined and appropriated by corporations.

The interpassive user defers both her labour and her enjoyment to the Other of the network; after all, the user is always left with nothing, and without a choice to opt out when it comes to networking and sharing. In the “programmed sociality” (Bucher, 2012) of the networked communities, ‘the ultimate tamagochi’ is a swarm of apps. Therefore, the notion

of “interpassivity” is not as harmless as it seems to Lovink (2012) and as it was, perhaps, in the original context of Žižek’s essay of the late 1990s where he spoke about ‘the delegation of passions and desires to others (the outsourcing of affect)’ at the beginning of the exploration of cyberspace’s frontiers.

Cynicism at the limits of enjoyment

In 2014, the high density of networked populations, and the scope of the algorithmization of sociality and cybernetic exploitation, combined with new economic models, force us to consider a different form of interpassivity. With Web 2.0, users’ interpassivity is now at the very core of the parasitic engagement with the network. As Franco ‘Bifo’ Berardi warns us, this leads to ‘the ultimate enslavement of human activity such as memory, language and so on’. The automation of cognitive activity by means of user friendly interfaces reduces complexity, and is nothing more than ‘the automation of passive connection’. [17]

Interpassivity operates according to the logic of a double deception in which the subject pretends to pretend: the user pretends to be passive by engaging in rather meaningless activity, avoiding acting or refusing agency, which inevitably requires the condition of another, less comfortable, passivity by stepping off the grid. The epistemological dimension of interpassivity does not concern knowing per se: it concerns a relation to knowledge, [18] in that it often takes the form of what Peter Sloterdijk has called the ‘enlightened false consciousness’ of modern cynicism (1987: 5).

Their psychic apparatus has become elastic enough to incorporate as a survival factor a permanent doubt about their own activities. They know what they are doing, but they do it because, in the short run, the force of circumstances and the instinct for self-preservation are speaking the same language, and they are telling them that it has to be so. Others would do it anyway, perhaps worse. Thus, the new integrated cynicism even has the understandable feeling about itself of being a victim and of making sacrifices. (Sloterdijk, 1987: 5)

This new type of interpassivity of the user-subject is behind user’s complicity with the network-machine – even after Snowden’s revelations about the totality of the NSA’s surveillance. But then, what does ‘after’ mean? To quote Sloterdijk again,

Psychologically, present-day cynics can be understood as borderline melancholies, who can keep their symptoms of depression under control and can remain more or less able to work. Indeed, this is the essential point in modern cynicism: the ability of its bearers to work – in spite of anything that might happen, and especially, after anything that might happen. (Sloterdijk, 1987: 5)

Jussi Parikka is right to suggest that ‘the “Post-NSA”-world implies the question of the Pre-NSA; Post-Snowden Leaks imply also the Pre-Snowden-Era;’ [19] but indeed, where did it begin – in 2013 or, for example, with the publication of James Bamford’s books about the NSA back in the 1980s? The first of these, *The Puzzle Palace: Inside the National Security Agency, America’s Most Secret Intelligence Organization*, came out 1983 and caught the attention of Friedrich Kittler, who wrote a short review of Bamford’s book entitled ‘No Such Agency’ published in 1986. Kittler concludes the review with the following:

With foresight, and while the rest of the world works according to John von Neumann’s classical computer architecture, the NSA is already switching again: to optical computers, surface acoustic wave filters and CCDs or charged-coupled-devices, which guarantee more than a thousand trillion multiplications per second.

This way, one day, those 99.9% of the data flow that still run past the NSA might become graspable and evaluable. (2014)

It matters whether we call Kittler’s account a ‘prediction’ or a logical conclusion drawn from materials such as Bamford’s book. It matters because the way we identify it reveals our relation to this knowledge of surveillance as either a staged unawareness or denial (if not a total foreclosure). In one of his essays for *The Guardian*, Žižek addresses the intolerable feeling caused by the disclosures of Snowden, Manning, and Assange. What makes it so unbearable, he speculates, is not that what they reveal is shocking news, but that this “non-news” is finally made public:

...we are facing the shameless cynicism of the representatives of the existing global order, who only imagine that they believe in their ideas of democracy, human rights etc. What happens in WikiLeaks disclosures is that the shame – theirs, and ours for tolerating such power over us – is made more shameful by publicising it. What we should be ashamed of is the worldwide process of the gradual narrowing of the space for what Kant called the “public use of reason.” (Žižek, 2013)

Here the knowledge itself is not as important as our relation to the knowledge. In Lacanian psychoanalysis, the relation to knowledge involves the question of pleasure, even extreme pleasure,* *jouissance**, and therefore, it pertains to the question of a clinical structure.

Thus, another important question involves users' relation to the unbearable pleasures of non-stop networking. The latter produces the effect and affect of merging with the machinic Other of the network which, to employ Lacanian vocabulary, exhibits a tendency to transform from a law-giving paternal function to an affective maternal body – overwhelming, consuming, and granting access to unlimited *jouissance* (Bosetti, 2010).

Perverse panopticon

In 2010, three years after apps became part of everyday experience, media analysts, scholars, producers and users were still debating their significance and impact on computational practices. [20] That year, the International Data Corporation (IDC), the major market intelligence firm that provides advisory services for the information technology, telecommunications, and consumer technology markets, acknowledged in its annual report that 'one of the most striking impacts of the extraordinary growth and evolution of the mobile apps ... has been the "appification" of broad categories of interactions and functions in both the physical and the digital worlds' (2010). Further, the report quotes Scott Ellison, vice president of the IDC's Mobile and Wireless research, who confirms the company's evaluation of apps' impact by using the earlier introduced neologism: 'Mobile app developers', he says, 'will "appify" just about every interaction you can think of in your physical and digital worlds' (IDC, 2010).

In *Software Takes Command*, Manovich offers us a new term, "softwarization", to describe the development and spread of 'media software' between 1960 and 2010. The term describes the state of things when 'creating cultural artifacts and interactive services which contain representations, ideas, beliefs, and aesthetic values,' 'accessing, appending, sharing, and remixing such artifacts', 'participating in the online information ecology by expressing preferences and adding metadata,' as well as 'communicating with other people' is done by means of software (Manovich, 2013: 23). Although Manovich does not distinguish between "appification" and "softwarization", by the end of the book, he locates apps in the global network of heterogeneous objects that the IDC identifies as 'the Third Platform':

None of the software apps and websites of the “social media era” function in isolation. Instead, they participate in the larger ecology, which includes search engines, recommendation engines, blogging systems, RSS feeds, and other web technologies; inexpensive consumer electronic devices for capturing and accessing media (digital cameras, mobile phones, music players, video players, digital photo frames, internet enabled TVs); and technologies that enable transfer of media between devices, people, and the web (storage devices, wireless technologies such as Wi-Fi and WiMax, and communication standards such as USB and 4G). Without this ecology most web services and mobile apps would not be possible. Therefore, this ecology needs to be taken into account in any discussion of social networks and their software – as well as consumer-level content access and media development software designed to work with web-based media sharing sites. (2013: 334)

It is not difficult to see how appification becomes the technique and expression of the cybernetic lifestyle. When any activity has an app for tracking it, the interpassive user has become a major actor of what Benjamin Bratton once called a ‘reversed panopticon’. Unlike Jeremy Bentham’s famous design of the greatest surveillance machine, where the subject is aware of the possibility of being the object of surveillance and, as a result, changes her behaviour by ‘internalising the authority’, the subject of the ‘reversed panopticon’ of the network is fully complicit with the governing machine despite the risks. This is an ‘ideal user’ who never stops performing for the gaze of the network, never stops clicking, never detaches from mobile gadgets.

Through the lens of Lacanian psychoanalysis, the ‘reversed panopticon’ is nothing less than the ‘perverse panopticon’ where the subject, as Bosetti suggests, strives to achieve a unity with the maternal body that promises direct access to unlimited *jouissance* (comments, ‘likes’ and many other continuous signs of simulated recognition, which are immensely more significant in the eyes of the user than those who ‘like’ and comment on that user’s posts). The embrace by the network is perceived as similar to a merging with the maternal figure. To stay with the architectural model, think of the ‘smart’ or parametric architecture that Parisi sees as the arrival of the post-cybernetic mode of soft control based on an infallible prediction of the dweller’s next move: not just the incursion of the future, but multiple futures, all at once.

For Lacan, a pervert structure (as any “structure” in the Lacanian understanding of the term) is not a problem, but rather, a solution to a problem that an individual invents in order to deal with the pain of existence (Swales, 2012: 54). In this case, the identification with the imaginary object of mOthers’ desire gives himself or herself up completely to the mOther’s enjoyment. This ‘fantasy’ of being the object of enjoyment (‘they read me’, ‘they like me’,

‘they see me’, ‘they want me’ – 24/7!) is a solution to not being able to give up or even limit one’s enjoyment. Such inability is stimulated by the capitalist network. If *jouissance* is the kind of intense pleasure that hurts and kills you, to learn how to renounce the pleasure attached to the experience of being the networks’ object of attention seems to be a key survival technique in the world of ‘liliputian robots’ that govern our lives.

I often think about some of the lost meanings and practices of solitude, of sensations of mild joy, and of a life that does not necessarily need to be happy and full, but is, in fact, lacking and can not only bear but actually treasure its own incompleteness. ‘Today, only the person who no longer believes in a happy ending’, Ernst Jünger wrote at the dawn of the cybernetic empire, ‘only he who has consciously renounced it, is able to live’ (2000: 207).

Biographical Note

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Notes

[1] See my conversation with Patricia Clough and Alexander Galloway 'On Governance, Blackboxing, Measure, Body, Affect and Apps: A Conversation with Patricia Clough and Alexander R. Galloway', in this issue of *The Fiberculture Journal*. For more on "the body-across-platforms," see: Clough, Patricia. 'Feminist Theory: Bodies. Science and Technology', in Bryan S. Turner (ed.) *Routledge Handbook of Body Studies* (New York: Routledge, 2012), 94–105. Also, see this talk: 'Patricia Clough: Feminist Theory, Bodies and Technoscience', Bringing the Body Back in Humanities and Social Science, a conference by the Committee for the Study of Religion at the CUNY Graduate Center, February 24 (2012), <https://vimeo.com/41526429>.

[2] Lev Manovich's biological metaphor from his book *Software Takes Command* (2013).

[3] See: Dupuy, Jean-Pierre. *On the Origins of Cognitive Science. The Mechanization of the Mind*, trans. M. B. DeBevoise (Cambridge, Mass.: MIT Press, 2009) and Heims, Steve J. *The Cybernetics Group* (Cambridge, Mass.: MIT Press, 1991).

[4] This first-order cybernetics of Norbert Wiener, Claude Shannon, John von Neumann Arturo Rosenbleuth, and Warren Weaver was mostly focused on the practices of observation and control of self-regulating systems and the interaction of the variables within them. The second-order cybernetics of the late 1960s and 1970s associated with such thinkers and scientists as Heinz von Foerster, Herbert Brün, Humberto Maturana, Gordon Pask, Stafford Beer, and Erich Jantsch, shifted focus from the controlled to autonomous systems and to the interaction between the observer and the observed. Later developments of cybernetics, often referred as the third-order cybernetics, which N. Katherine Hayles sees as focused on 'virtuality and dates between 1985 and 1995 (Hayles, 2006: 161) explored the relations between the observers (Johannessen and Olaisen, 1993) and the mechanisms by which the observer and the system co-evolve together. As Vincent Kenny describes third-order cybernetics, it explores 'both the selfhood (subjectivity) of the observer and also the relationship of this subjectivity to any observed system (which can be in either the "external" or the "internal" worlds) – and questions any claims, tacit or explicit, relating to a privileged access to these worlds. The focus of a 3rd C is necessarily on "foundationlessness" – of having nowhere to "stand" and also on the uncertainty and undecidability of what we may claim to "know." See: Kenny, Vincent. "There's Nothing Like the Real Thing": Revisiting the Need for a Third-Order Cybernetics.' *Constructivist Foundations* 4.2 (2009): 100–111, <http://www.univie.ac.at/constructivism/>

journal/4/2/100.kenny. Hayles also identifies the fourth order cybernetics after 1995 as ‘the regime of computation’: ‘The characteristic dynamic of this formation is the penetration of computational processes not only into every aspect of biological, social, economic and political realms but also into the construction of reality itself, where “reality” should be understood, as Haraway says in a different context, as “made” but not necessarily “made up”’ (Hayles, 2006: 161).

[5] We can also read such ‘respect’ as what is posited by such notions as “flat ontology” (DeLanda, 2002: 41) or “the democracy of objects” (Bryant, 2011) in the recent work of speculative philosophers.

[6] The title of the special issue of *Ekistics* (a journal dedicated to the science of human settlements defined by Constantinos Doxiadis) from May 1970 that discussed the ‘move from a mechanical to an electronic environment.’ The topic of the Delos conference that year, was ‘From Man’s Movements to His Communications’ (Wigley , 2006: 385).

[7] Wigley mentions that this meeting, as enticing as it was for both thinkers, was not without some tension: ‘ [r] felt that his ideas, including the concept of the global village with which McLuhan would soon become famous, had been taken without acknowledgment. Yet a strong friendship was immediately established. This was greatly assisted by the fact that, as Fuller recalls it, McLuhan was carrying copies of his *Nine Chains to the Moon* (which had just been republished) and *No More Second Hand God* when they first met on the boat, declaring, “I am your disciple. ... I have joined your conspiracy.” McLuhan, who had denied getting the idea of prosthetic extension from anyone until he met Fuller, later told his friends that Fuller was too much a “linear” thinker. Fuller told his friends that McLuhan never had original ideas, nor claimed to. He simply remixed available material in an original way’ (2006: 377–378).

[8] Quoted in Bogost, Ian and Nick Montfort. ‘Platform Studies: Frequently Questioned Answers’, *Digital Arts and Culture*, December 12–15 (Irvine, Calif., 2009), http://nickm.com/if/bogost_montfort_dac_2009.pdf.

[9] See: ‘IDC Predicts 2014 Will Be a Year of Escalation, Consolidation, and Innovation as the Transition to IT’s “3rd Platform” Accelerates’, <http://www.businesswire.com/news/home/20101213005128/en/IDC-Forecasts-Worldwide-Mobile-Applications-Revenues-Experience>.

[10] See, for example, 'On Governance, Blackboxing, Measure, Body, Affect and Apps. A Conversation with Patricia Clough and Alexander R. Galloway'.

[11] The terms "complicit subject" is not ideal as it is a form of 'terminological stuttering', since this specific form of complicity as dependence is already a pure form of subjectivity, as I understand it. However, for the purposes of my discussion on the phenomenon on complicity, I keep this term phrase as it is.

[12] On the research on disability conducted by the Bell Labs and, later, the MIT, see Mills, Mara. 'On Disability and Cybernetics: Helen Keller, Norbert Wiener, and the Hearing Glove', *differences: A Journal of Feminist Cultural Studies* 22.2–3 (2011): 74–111.

[13] See Bosetti, Luca. 'Three Questions on Prosthetic Technology and A-(d)iction', *Paragraph* 33.3 (2010).

[14] See Eric Kluitenberg, 'Second Introduction to an Archaeology of Imaginary Media,' in Eric Kluitenberg (ed.) *Book of Imaginary Media: Excavating the Dream of the Ultimate Communication Medium* (NAi/De Balie, 2006), 5.

[15] In the earlier published version of this argument in 1996, in the essay 'On Totalitarian Interactivity,' Manovich even calls interactivity "totalitarian": 'interactive computer installations indeed represent an advanced form of audience manipulation, where the subject is put within a structure very similar to an experimental setup of a psychological laboratory or a high-tech torture chamber of CIA or KGB, the kind we saw frequently in spy films of the Cold War era' (1996). Also see Alexander Galloway's discussion of this essay in *The Interface Effect* (Cambridge, UK: Polity, 2012), 6–9.

[16] See Wikipeda entry on the 'Third Platform': https://en.wikipedia.org/wiki/Third_platform.

[17] Franco 'Bifo' Berardi's lecture 'Abstraction and Poetry in the Age of Financial Capitalism' at the University of Western Ontario on 29 November 2014.

[18] In a sense, the “cybernetic hypothesis” sank into today’s discourse of “network freedom” that draws the attention away from the questions of surveillance and exploitation. In *From Counterculture to Cyberculture*, Fred Turner demonstrates how the transformative power of the “New Economy” and the potentials of the networked entrepreneurship were evident only to certain circles of those who envisioned and proclaimed cyberspace as the new “electronic frontier” of freedom (2008 [2006]: 7). Discussing the role of Stewart Brand, who allegedly coined the term “personal computer,” and his crowd, Turner observes:

Although they rejected the military-industrial complex as a whole, as well as the political process that brought it into being, hippies from Manhattan to Haight-Ashbury read Norbert Wiener, Buckminster Fuller, and Marshall McLuhan. Through their writings, young Americans encountered a cybernetic vision of the world, one in which material reality could be imagined as an information system. To a generation that had grown up in a world beset by massive armies and by the threat of nuclear holocaust, the cybernetic notion of the globe as a single, interlinked patterns of information was deeply comforting: in the invisible play of information, many thought they could see the possibility of global harmony. (Turner, 2008 [2006]: 5)

[19] See Parikka’s blog: <http://jussiparikka.net/2014/07/23/echelon>.

[10] See, for example, Chris Anderson and Michael Wolff, ‘The Web is dead, long live the Internet,’ *Wired*, August 2010 (<http://www.wired.com>). Also, Tim Berners-Lee, ‘Long live the Web: A call for continued open standards and neutrality,’ *Scientific American*, November 22, 2010 (<http://www.scientificamerican.com>).

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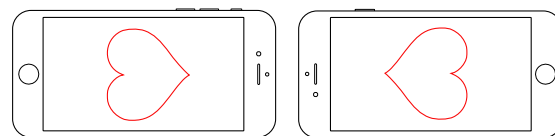
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FCJ-185 An Algorithmic Agarthā: Post-App Approaches to Synarchic Regulation

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Abstract:

This rather suggestive and altogether speculative essay began as an attempt on our part to use a model of bio-chemical signal-transduction (Howard Rasmussen's schema for 'synarchic regulation') to explain, beyond the boundaries of cell-transduction in molecular chemistry, transduction in cell-phone applications: the 'synarchic regulation' — and rather remarkable reticulation — of 'cellular transmission' in the techno-communicational rather than bio-chemical field. It was to be a complement and/or an alternate perspective to our conference-paper and subsequent book-chapter on the 'app-alliance' both of which had been written in and for the event of the Apps and Affect conference in October 2013. It became something slightly different, unmoored from mere cellular transmission as such and suggestive of a much more general and more comprehensive techno-scientific, market-economic and politico-military — or 'synarchic' — network, operating as the regulative engine for an emerging and overarching planetary system of algorithmic governance. In what follows, we offer an 'app'lication of the principles of 'synarchic regulation' to the field of 'algorithmic governance'.

Let us begin with indefinition (the indefinite): specifically the question of information — proceeding from there to the myriad methods and mechanisms used to capture and control (or ‘net’) it.

There is no single, unified mechanism governing the definition and distribution of information today, and this may account for some of the major tensions and tendencies in the so-called ‘information era’. The concept of ‘information’ itself has no single, unified definition, even though there are various theories that have been put forward to conceptualise it — as some ‘thing’ akin to a commodity-cum-object that can be possessed (indeed purchased), traded and legislated, or alternatively (for example) as a ‘process’ akin to signal-transmission, feedback- and/or stimulus-response circuits (‘information transfer’ and ‘information flow’). Hence, although information may be a useful and much-used idea, there is as yet no agreement on its basic definition and ‘no unified theory appears imminent’ (Schement and Curtis, 1995: 2). Similarly, there is no one single, unified, global mechanism for the governing of societies—that is, there is no one law, one political form, one economic system, one unified science: a fact that does not mean, however, that there is an absence of mechanisms for the governing of information-flows (political, economic, scientific) but rather — and this is our point — that there are several such mechanisms in operation. That said, the past decade has witnessed rather remarkable convergences in the globalisation of politico-military surveillance, marketplace economics and ongoing scientific investigation, all of which hinge on the accumulation, processing and management of this ill-defined concept (*un concept informe*, in the words of the late Georges Bataille viz. formation and information, 1929: 382).

The recent controversies surrounding Facebook’s ‘Emotional Contagion’ study, [1] TrapWire’s and Stratfor’s (Strategic Forecasting Incorporated’s) ongoing CCTV-monitoring equivalent to Philip K. Dick’s previous science-fictional ‘Pre-crime Unit’, [2] Edward Snowden’s revelations concerning the extent of the global surveillance security state (and his most recent NBC interview) [3], the July 2014 rush to pass the Data Retention and Investigatory Powers — DRIP — bill without debate in the United Kingdom [4], et cetera, demonstrate with unnerving clarity the convergence of at least three distinct but interrelated forces of info [5]-governance: politico-military (involving regulatory pathways and mechanisms of government and national/state security), market-economic (involving pathways and mechanisms of market investment and exchange), and techno-scientific appropriations and applications of information (involving pathways and mechanisms for intellectual research and development). What we see is that the political governance and regulation of information (q.v.) is always at the same time intricately implicated with economic and scientific forces; political control, in other words, always overlaps with commercial transactions and scientific investigations. Our central contention in this essay is that information — its very definition[s] and its variable distribution[s] — tends to be

regulated synarchically: that is to say, the circulation of information today is appropriated and applied (captured, categorised and conveyed), not to mention produced and propagated, in at least three distinct but interrelated ways, which for present purposes are here outlined in terms of politico-military, market-economic and techno-scientific mechanisms of info-regulation (which implicate and include ‘interests’, ‘agencies’, and ‘organisations’/‘institutions’/‘assemblages’ of varying sorts). Therefore, governance is never merely or even principally just a political concern that falls exclusively within the purview of political interests and institutions; rather, in the schema we would like to present, governance is always synarchically regulated. Governance in the ‘information era’ — which is the governance of information: its definition and distributions — should always be conceptualised as simultaneously ‘political’, ‘economic’ and ‘scientific’ (albeit always in differing degrees and in varying concentrations, as will be made clear in what follows).

These ‘political’, ‘economic’ and ‘scientific’ regulators function in many respects like the ‘archons’ — Greek *ρχοντες*: ‘rulers’, ‘regulators’ or ‘governors’ — to whom the late Howard Rasmussen (founding director of the Institute of Molecular Medicine & Genetics at the Medical College of Georgia, former chief of Endocrinology & Metabolism at the School of Medicine at Yale University, and erstwhile Chair of the Biochemistry at the University of Pennsylvania) refers in his study of Calcium and cyclic Adenosine Mono-Phosphate — cAMP — as synarchic messengers: ‘The term synarchy’, Rasmussen explains, ‘is based upon the Greek term archon’ (*ἄρχων*: ‘ruler’, ‘regulator’ or ‘governor’). ‘Because of the importance of their role in disseminating information’ — *οικονομική, πολιτική και πνευματική-ιδεολογικό*: economic, political and ideologico-intellectual — archons ‘were often employed in pairs to carry the same message or, under other circumstances, only part of the total message’ (Rasmussen 1981: 2). In other words, an archon tended to work in conjunction and collusion with other archons (*archontes*): i.e. in a syn-arch[on]ic manner. ‘Because [of this] analogy’ — for which ‘I am indebted to Victor Bers of the Classics Department at Yale’, he admits — ‘the term synarchic regulation (syn meaning ‘together’) is proposed to categorize this system’ (1981: 2)

In the present paper we want to suggest that not only is the question of governance entirely a question of information (q.v.), but also that in the new world order, whenever and wherever signals which enter into a given communicational environment stimulate noticeable friction (‘and thus facts take place upon which it is impossible to calculate’, as Clausewitz — describing such ‘friction’, ‘fog’, or operational obscurity — explained in his treatise *On War*, 1943: 53–4) at odds with either the political, economic or scientific orders, these become subject to simultaneous ordering and organisation by all three control systems, synarchically. Although Rasmussen applies his model of synarchic regulation to a set of sub-cellular processes — namely the complex bio-chemical ‘stimulus-response’ chains initiated by a cell-system’s encounter with specific external signals — he claims

in his study that synarchy can, to a certain extent, be considered a ‘generic’ mechanism or ‘universal’ schema of information-transfer (1981: 130). Here we would like to take up the Rasmussenian schema as a way of thinking about what happens when externalities — specifically ones that cause a high degree of friction or calculative obfuscation for regulatory institutions and institutional algorithms, i.e. signals which appear to display cascading contingencies — disrupt the otherwise relatively stable (at times and in certain places what would seem to be seamless) self-organisation, self-sustaining, or ‘maintenance’ of political, economic and scientific regimes/regulations of information (info-reticulation). In any given environment where friction or uncertainty is perceived as a possible threat or disruption with respect to the coordinated flow of political, economic and scientific control, the simultaneous (synarchic) activation of political, economic and scientific information-governance is initiated as and for the sake of the normal (normative) metabolic processes of their respective and joint information system[s]. We use the term ‘synarchic regulation’ (taken from Rasmussen) in this case to refer to that particular triad of control-mechanisms which work together to informatically manage and govern friction[s] within a given information-environment.

So, how is information synarchically regulated? According to Rasmussen, through a kind of *saptapadian*, or sevenfold/sevenstep semiconduction: that is, 1. by signal recognition and reception, 2. transduction or translation of the latter, 3. incorporation and material conveyance of this transduction/translation, 4. reticulation and reticulated reception (or if you like, ‘digestion’) of the received and incorporated material, 5. transformation or modulation of behaviour based on this reticulation, 6. consequent response — actual and/or virtual, but in any case modified — based on this transformation, and 7. the application of a term —a terminological marker—closing and disclosing this loop *qua* circuit. [6] These seven particular protocols are the mechanisms of info-metabolism by which externalities perceived as ‘anarchic’ (i.e. beyond the bounds of archons, regulators) are ‘metabolised’ as meaningful, manageable messages that can be transduced, transmitted and interchanged between political, economic and scientific domains. Borrowing again from Rasmussen, these protocols are piloted — directed, driven — by one of five functional frameworks *qua* piloting permutations (that is, they are handled by one of only a handful of handling procedures): depending on the nature of the ‘abnormal’/‘atypical’/‘anarchic’ activity, the protocols can be either sequentially steered, hierarchically handled, controlled via coordination, regulated through redundancy, or arranged and articulated altogether antagonistically (1981). When activated in response to a single (singular) externality, ‘coordinate control’ takes place: political, economic and scientific responses — proceeding according to the aforementioned protocols — participate in a coordinated fashion to regulate information within a given milieu (1981: chapter 5). [7] By contrast, ‘hierarchical control’ (1981: chapter 6) takes place when different concentrations of the same externality call for the separate activation of political, economic and scientific mechanisms, which interact in a hierarchical manner (one or the other ‘taking the lead’ as dictated by the situation) to produce complementary and enhanced environmental responses.[8]

‘Sequential control’ (1981: chapter 9) involves the primary/preliminary activation/mobilisation of one of the archon-administrations followed by the activation of the other two as a result of an increase in the intensity of the first operation. [9] Finally (finishing the list of the five frameworks or piloting permutations), ‘redundant control’ (1981: chapter 7) takes place when separate externalities initiate the same response, and ‘antagonistic control’ (1981: chapter 8) occurs when all three archon-administrations are active — each activated by separate externalities — but the intensity of one of these controls cuts/counters/hinders (i.e. antagonizes) the effect[s] of the others, that is: when the synarchic institutions and institutional mechanisms turn out to conflict one with the other.

By focusing on the overarching relations in a given control-operation, these Rasmussenian classifications can be of considerable value, drawing attention as they do to the organisational complexity — the complex interaction[s] — of the suggested synarchic control-system and to the remarkably ‘networked’ nature of its technical missions and various transmissions (its reticular emissions, in sum). The latter leads us by a *commodius vicus* of recirculation to something which we — the present essay authors — had discussed in a recent review [10] of Bernard Stiegler’s three-volume series on *Disbelief and Discredit* (2011, 2012, 2014) where Stiegler wrote of the ‘missionary’ work of contemporary technocratic endeavours and reminded us, when we had read those two sections of his study (2011: Sections 1.5 and 1.6), of an even earlier version and vision of synarchic regulation formulated one hundred years before that of Howard Rasmussen by Saint-Yves d’Alveydre in 1882.

In *The Decadence of Industrial Democracies*, Stiegler highlighted a certain *Spiritus Mundie* — our words rather than his, *N.B.* — at work in the present-day digitised world, referring as he does to the case of Craig Mundie (former Chief ‘Research & Strategy Officer’ and current ‘Senior Advisor to the Chief Executive Officer’ at the Microsoft Multinational Corporation) who ‘has explicitly aimed since 1997 to control digital television’; ‘in that year’, explained Stiegler, Mundie ‘declared that the world contained a billion televisions, enabling just about every consciousness on the planet to be reached’ (Stiegler 2011: 21). The presence — indeed omnipresence — of a *missionary* (or if you like, *emissionary*) spirit became all the more clear: ‘at very nearly the identical moment that Mundie launched his mission’ (sic), Irving Kristol declared that its ‘missionaries ... live in Hollywood’ and thus that Mundie’s ‘mission for a new television system technically based on multimedia technology, to be created by [the] Microsoft [Corporation]’ (Stiegler 2011: 21), was indeed, beyond the bounds of an economic strategy (and, being global, a political one), also ‘missionary’ in the spiritual sense of the word, and in the spiritual sense of a world-encompassing war as well. ‘It is very much a matter of missions’, explains Stiegler,

... that is, of spiritual war. Even if this crusade has, since the ... election of George W. Bush, been transformed into a [quote-unquote] conventional war, ... the genuine issue for industrial democracies ... is still to construct their own politics and economy of spirit ... in accordance with digital technologies and the new industries they make possible, as well as in accordance with unprecedented practices ... which must not be confused with anything that marketing or industrial design refers to in terms of uses. (Stiegler 2011: 21)

The correlation of political, economic and spiritual agendas/affairs/activities ('actions'), operating independently but inter-reticulatedly, and the hypothesis (via Stiegler) not only of their crossing or converging — their net or network — but of their likeness to a modern-day 'crusade' (harkening back to the 'spiritual war' of the Medieval Templars, which was at once spiritual, political and formidably fiscal) calls to mind — as we mentioned above — the works of Saint-Yves d'Alveydre, whose vision of 'synarchy' had the very same structure, inclusive of networked 'missions'. Alexandre Saint-Yves, a contemporary of Friedrich Nietzsche, started his career as a naval physician in northwestern France around 1860, fought in the Franco-Prussian War in 1870, worked as a civil servant and independent scholar in years following that, and began publishing his theory of synarchic missions in the early 1880s. Reviving in many respects the syncretic theory of Antoine Fabre-d'Olivet outlined in the generation that immediately preceded him (Fabre-d'Olivet being perhaps best-known through the writings of the later Édouard Schuré, whose 1889 treatise on *The Great Initiates: A Study of the Secret History of Religions* disseminated the crux of the Fabrean worldview to a wide readership), Saint-Yves examined throughout his life the mytho-historical missions of the great governors and governance-networks from mythic antiquity to his historical time-period, [11] including for instance the mission of Manu in *La mission de l'Inde*, the mission of Moses in *La mission des juifs*, that of Charlemagne in *La mission des souverains*, as well as the ongoing medieval 'allegorithm[ission]', so-to-speak — to steal a word from Wark (2007: 30–50) and Galloway (2006: 91) — of the Medieval guilds and old Templar networks that, according to him, form the matrix that undergirds (or rather, should undergird) the activity of industrial workers (and the 'integral interrelation' of industrial workers with industrialised — or if you prefer, post-industrial — governance, the latter in the brief/62-page *Mission des ouvriers* and extensive/542-page *Mission des Français*). These five treatises form the manuscript — speaking of Manu (*manu* here in the Latin rather than Sanskrit sense: that is, as the handy *manus*) — by which and with which Saint-Yves's vision of 'synarchic governance' can be grasped. The missions are, like the five Rasmussenian controls, model-modes for the saptapadian semiconduction of globe-girdling synarchic system: a global governance-system at the heart of which lies a conjunction and collusion of archons (archontes), 'regulators'. [12] In a manner not entirely unlike that of Rasmussen [13] — but macro- rather than micro-scopic, anthropological rather than biochemical — Saint-Yves envisioned these archons as a set of distinct yet inter-communicating systems which he saw as financial-commercial (or what we called 'market-economic', above), political-judicial (or what we called 'politico-military') and

spiritual-pedagogical (or what we called ‘scientific-intellectual’) archon-administrations, each possessing its own governor-administrators whose power is invested in regulating messages that come in — or are intercepted—from other spheres of influence. But unlike Rasmussen’s five-pronged model of synarchic regulation, the archons of Saint-Yves’s synarchy are ordered in straightforwardly hierarchical fashion (i.e. according to the Rasmussenian schema above, they are exclusively characterised by ‘hierarchical control’), privileging the spiritual-pedagogical archon over and above the political and the economic.

Today one would have to admit that synarchic regulation extends far beyond the straightforwardly hierarchical version and vision outlined in the work of Saint-Yves, and — following the more contemporary Rasmussenian model — that it would have at least a handful (at least a five-fingered digital deck) of piloting permutations for the political, economic and scientific regulation of information. In our algorithmically-driven information era, which appears as an algorithmic ‘Agartha’ (the name of St. Yves’s synarchic utopia which was hidden under the earth [14]), political, economic and scientific ‘control becomes a matter not just of the management of bodies and their wants’ ‘but a more subtle business of extracting’ and directing informational entanglements within any environment. [15] Synarchically regulated society, driven by digital techno-mediation and the rising demand for developing and monetising interactive virtual realities, opens whole new vistas for the kinds of power that can co-opt and commercialise not only a human’s bodily labour-power through the (inter)disciplinary control of its work, but also control — again recalling Rasmussen’s synarchic schema — the neuro-chemical and neuro-architectonic levels of information-transmission that Lazzarato (2006: 171–91) and Stiegler (2011b: 52–61) and Scott Bakker in his novel *Neuropath* and his *Three Pound Brain* blog [16] would call a neuro-‘nöopolitics’. The synarchic steersmen and ‘elites’ envisioned in Saint-Yves’s synarchic model of Agartha [17] (the subject of much controversy amongst his most critical readers and fuel or fodder for a host of para-academic conspiratists) in this [more current] case are entirely electronic — the electronic elite being one of the signs of an already-arrived post-humanism in which ‘human being’ itself becomes syn-tactically and syn-technically constituted by synarchically-regulated missions, emissions, transmissions, transductions. As Alexander Galloway and Eugene Thacker have reminded us, today’s exploitation occurs ‘informatically as well as corporally... The biomass, not social relations, is today’s site of exploitation’ (2007: 135) . Thus, as Stiegler himself warns (2011, 2012, 2014), ‘individuation’ along with the possibility of the ‘privacy’ and ‘free time’ (*otium*) essential for such individuation, is and are rapidly becoming extinct, having become ‘short-circuited’ and rerouted (i.e., captured, categorised and conveyed) by the ‘programming industries’ of current hyper-industrial capitalism in and through real-time [hyper]synchronisation, as well as the synched mass-production qua mass-management of human behaviour (Stiegler 2011: 23).

No one domain, one institution, or one set of elites are holding the reins over the regulation of information — its technical designs and technological applications (this latter being the current and currency that animates the inter-communicational control-mechanisms of governance in the 21st century) . Within the context and current logic of ‘open data’, ‘regulation’ is not to be considered rigid and deterministic but instead something flexible and open to variation. Rather than being rule-focused, today’s regulatory processes are said to be outcomes-based: ‘Regulations, which specify how to execute those laws in much more detail, should be regarded in much the same way that programmers regard their code and algorithms — that is, as a constantly updated toolset to achieve the outcomes specified in the laws’ (O’Reilly 2013). This kind of algorithmic regulation is more than merely a metaphor; it is the mutable operational logic of a synarchically-regulated planet-wide informational governance-system. And while individuals, elites, interest-groups and governmental-organs — all the normal and normative ‘agents’ or ‘actors’ commonly considered by political and social scientists — are still conduits for synarchic regulation, the so-called ‘transformative potential’ of today’s informational paradigms lies almost exclusively within the processing power of algorithmic (and not necessarily human) intelligence:

No human being can write fast enough, or long enough, or small enough ... ('smaller and smaller without limit ... you'd be trying to write on molecules, on atoms, on electrons') ... to list all members of an innumerably infinite set by writing-out their names, one after another, in some notation. But humans can do something equally useful in the case of certain enumerably infinite sets: they can give explicit instructions for determining the n th member of the set, for arbitrary finite n . Such instructions are to be given quite explicitly, in a form in which they could be followed by a computing machine, or by a human who is capable of carrying out only very elementary operations on symbols. (Boo-los and Richard 1974: 19)

In the era of algorithmic governance — when the capture, co-ordination and capitalisation of data has been adopted wholesale by neo-liberals in the name of consumer convenience and increased governmental/educational/medical efficiency on the one hand, as well as by neo-conservatives in the name of a preservation of security and moral values on the other — we are managed, more and more, by automated info-systems (systems of scientific, governmental, and commercial information-transfer) that ‘steer us’ synarchically — that is, ‘govern us’ by regulating the flows of [our] data, and information more generally, in three interrelated domains: politico-military, market-economic and techno-scientific. From the increased governmental surveillance of socio-commercially produced data (typically in the name of national security, defense against terrorism and public health) to the increased interest in the ‘smartification’ of every environmental object (e.g. ambient computing, self-driving cars and ‘the internet of things’), the control and regulation — read:

standardisation — of behaviour is being conducted by automated informatic processes that produce so-called ‘desired outcomes’ based on real-time, modulated feedback. ‘It is axiomatic that any activity performed by many persons on a regular or continuous basis will be monitored by the managers of our socio-economic system’, wrote Robert MacBride (former corporate communications specialist in the American aerospace and weapons-systems industries) back in 1967; ... the activity need not have any other significance than this’ — and:

... if enough people are doing it, it will become either a source of profit to some group or a problem to another ... Put another way, activity produces information, and information produces a computer system. But the computer system itself, as it records, processes, and stores all this source data, becomes a source of information. In many respects, it is a far richer source than the activity itself, since the data are already in machine-readable form. (MacBride, 1967: 82)

The digitisation and automatising of data-processing systems ‘that record, store, classify, calculate, compare and print at lightning speed’ (MacBride, 1967: 80) in accordance with specific algorithmic rules does not merely make the management and the present costs of doing ‘business’ cheaper or easier (although this is definitely the way that the digitisation of information is being politically and commercially sold to us): it also regulates future actions by making projections and prescriptions about the specific courses of future activity — e.g. what in the banking sector is referred to as ‘forecasting’ about an investment’s future ‘outlook’ — in scientific, politico-military and economic affairs. Algorithmic governance ‘synarchically regulates’ by creating both the ‘informational problems’ and the latter’s ‘computational solutions’ within a given environmental system; thus, in the words of Robert MacBride once again, ‘it is also axiomatic that if an activity is of sufficient interest to warrant the use of primary computer systems, it will become at least equally profitable to develop a second-level system capacity’ (MacBride, 1967: 82–83). ‘This is exactly what has happened to all third-generation computer systems (those that process data in real-time)’, he notes; ‘Now each purely operational system can summarize and analyze the mass of operational data that it processes; this capability was added to the primary systems in many of the earlier systems, but as its value comes to be appreciated, a second-level capability tends to be built-in from the beginning’ (MacBride, 1967: 82–3). This ‘built-in’ function of nested informational capabilities is virtually limitless insofar as it effectively and indefinitely creates the technical conditions for its further expansion and development.

As long as the major costs of gathering and processing information are covered by the system's primary level output, by-product data can be had at virtually no extra cost. As it stands, this is interesting but hardly of epochal significance. However it becomes so when you consider that the amount of by-product information can be obtained in this way is virtually unlimited. The appreciation of this is what the computer revolution is all about. (MacBride, 1967: 79–80)

The Automated State: Computer Systems as a New Force in Society (1967) declared with remarkable prescience that one of the basic principles of computer systems — ‘one that has great bearing on how they develop and expand in new areas’ — is ‘the uses of information about information’ (his emphasis) as opposed to ‘information about things (or persons or events)’ (79). Against the prevalent view that widespread computerised automation would remain useful and innocuous tools under the control of traditional historical institutions and values, its author, the aforementioned MacBride, suggests instead that computational data-processing, in addition to solving problems and processing routine data, would become the core driver steering the development of future social, economic and scientific knowledge: namely, a vast and complex computational communications network that directs and controls message-traffic throughout the network, thus forming automated pathways and protocols that more automatically regulate power. Echoing *avant-la-lettre* the point made by Gilles Deleuze in his ‘Postscript to Societies of Control’ (1992) that the disciplinary societies of enclosure described by Michel Foucault — in which individuals never ceased to pass through enclosed and institutionally molded environments—have today given way, more and more, to digitally reticulated and informatically modulated environments:

The different internments of spaces of enclosure through which the individual passes are independent variables: each time one is supposed to start from zero, and although a common language for all these places exists, it is analogical. On the other hand, the different control mechanisms are inseparable variations, forming a system of variable geometry the language of which is numerical (which doesn't necessarily mean binary). Enclosures are molds, distinct castings, but controls are a modulation, like a self-deforming cast that will continuously change from one moment to the other, or like a sieve whose mesh will transmute from point to point’ (Deleuze, 1992: 4).

MacBride locates the catalyst for future governance in the automated informational processes that Deleuze would characterise in his essay as ever-expanding ‘ultra-rapid forms of free-floating control’ (Deleuze, 1992: 4). Again, in an almost prophetic manner, MacBride urges us to think of the impact of computational systems, or what today is being

called algorithmic governance, not in terms of structures and structure-units, but instead as assemblages of human and non-human information-processes involving such diverse components as hardware, software, strategies, policies, and of course (the highlighted element here), human beings.

Suppose that instead of a socio-economic structure, we are dealing with a process, a system, or a kind of fermentation. If we then see our socio-economic system as the manifestation of a flow of intelligence—of transfers of information — a complexity of varying quantities and rates forming different channels, then the computer's alteration of even some of these ultimately changes everything. Established channels are overloaded, bypassed. New channels are formed ... Equilibrium never occurs. And the socio-economic pattern itself is entirely and unintentionally transformed. ... We are not faced merely with an automation-employment problem, or (anticipating a little) an invasion-of-privacy problem, but with an interlocking set of rapidly evolving situations in which computer systems will exert an unforeseen effect. The form of every social and economic development will be more than subtly determined by the manner in which computer systems are woven into them. It is not too much to say that the whole manner of our lives, the limits of the possible for each of us, will be subject to the continuous effects of the evolution of machines. (MacBride, 1967: 76–6)

Just as MacBride here prognosticates about the future capacity of computational systems to capture and control — regulate and reticulate — the informational channels by which individuals are steered through any given system of informatically nested environments, we have further suggested in our paper that this mode of control — 'algorithmically governed' as it is — is also, in addition, 'synarchically regulated' and hence implicates the involvement and interrelation of techno-scientific, market-economic and politico-military information-rationales. No longer can we naïvely hold onto the view espoused by techno-optimists like Tim O'Reilly that 'new technologies make it possible to reduce the amount of regulation while actually increasing the amount of oversight and production of desirable outcomes' (O'Reilly, 2013; also quoted in Morozov, 2014); in fact, as we have tried to suggest, we can expect increases in synarchically regulated algorithmic governance — what we have herein described as the politico-military, market-economic, and techno-scientific regulation of behaviours and activities by way of increasingly intelligent complex information-processes.

As Evgeny Morozov argues in *The Guardian*, shifting narratives and policies have drawn our attention away from the critical but seemingly dystopian public discourses that demand accountability and transparency from institutions and corporations, to the forces of an apparently utopian techno-solutionist algorithmic 'Agartha' — 'Agartha' understood as a globally-reticulated/planet-wide system of synarchic regulation — which seeks to render political dissent and dialogical deliberation all but obsolete under the use of innovative planetary governance-strategies:

In shifting the focus of regulation from reining-in institutional and corporate malfeasance to perpetual electronic guidance of individuals, algorithmic regulation offers us a good-old technocratic utopia of politics without politics. Disagreement and conflict, under this model, are seen as unfortunate by-products of the analog era — to be solved through data-collection — and not as inevitable results of economic or ideological conflicts. However, a politics without politics does not mean a politics without control or administration. ... Thus, it's a mistake to think that Silicon Valley wants to rid us of government institutions. Its dream state is not the small government of libertarians — a small state, after all, needs neither fancy gadgets nor massive servers to process the data — but the data-obsessed and data-obese state of behavioural economists. (Morozov, 2014)

In other words, the immediate adversaries are those who, in the name of technical efficiency and technological innovation, seek not to curtail and simplify but to amplify, expand and monetise the algorithmic governmentalisation of everyday life. Synarchically regulated algorithmic governance fosters the development of predictive analytics [18] and — in a techno-pharmacological sense — information addiction[s] (calling to mind what Rachel Law has recently called ‘datamania’ [19]) that depend on reconceptualising individuals as data-bodies: that is, as a discrete set of data-points — what Deleuze called ‘dividuals’ [20] — that can be tracked, coordinated and re-assembled (this is what theorists today call ‘surveillant assemblages’ [21]). While these facts in-themselves may not be enough to warrant pessimism for many, ‘algorithmic regulation—whatever its immediate benefits — will give us a political regime where technology corporations and government bureaucrats call all the shots’ (Morozov, 2014). Naïve techno-optimism lacks the gumption necessary to overturn the false (often intentionally deceptive) impression that algorithmic governance, with its discourses of ‘big-’ and ‘open-data’, leads inevitably to less bureaucracy and error, more time and efficiency, more individual freedom, more social knowledge. What algorithmic governance leads toward — as both Morozov and others endeavour to show, Edward Snowden especially, N.B. — is, not freedom from demagoguery, despotism and oligarchy, but synarchically-regulated convergences of information-governance that often elude public scrutiny and societal deliberation.

In the final analysis, instead of the utopian vision of ‘ubiquitous connectivity’ wherein ‘the digital cloud’ would unite humans and non-humans (subjects, objects, what-have-you) in an ever-tightening mesh of mechanisms that would cater to every need and desire from the most mundane to most exotic, algorithmic regulation should be understood as the control and regulation of network-behaviour conducted by automated informational processes that produce so-called ‘desired outcomes’ for humans based on real-time modulated feedback. Algorithmic governance is thus a paradigm of self-organisation in which networks are governed, managed and reproduced through the capture and processing of

digital information (and this necessarily in a synarchic manner, as we have argued): the use of algorithms leads to the need for more algorithms to manage the previous algorithms, and so on and so forth. Now, techno-utopians like O'Reilly assure us that this is nothing to worry about; in fact, algorithmic regulation 'makes the market more transparent and self-policing' (O'Reilly, 2013), thereby accomplishing all the goals of good governance that humans have always sought but have rarely found in their politics and politicians. Algorithmic governance is an as-yet just-discernible form of planetary governance based on ubiquitous machine mediation and regulation; it colonises and propagates by creating more opportunities for digitally regulating information, thus creating the conditions for continued algorithmic expansion into networks of increasingly planetary scale. Like Bacon's *New Atlantis*, which describes a utopia ruled by 'Salomon House', a college of benevolent scientific keepers of knowledge, algorithmic governance promises the rule of algorithmic knowledge applied to the betterment of human beings. And yet the promise of 'more transparency' turns out to mean, for those such as O'Reilly, 'more disclosure of data' in 'machine readable' form: 'regulation', he says, 'depends on disclosure — on data required by regulators to be published by ... firms in a format that makes it easy to analyze' (2013). The seeming freedom produced by algorithmic regulation ends up becoming entangled with a strictly machine-readable model of governance in which and through which humans are controlled by digitised networks of increasingly synarchically regulated data-flows.

Biographical Notes

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Notes

[1] Adam Kramer, Jamie Guillory & Jeffrey Hancock, 'Experimental Evidence of Massive-Scale Emotional Contagion through Social Networks', *PNAS: Proceeding of the National Academy of Sciences of the United States of America* 111.24 (June 2014), pnas.org/content/111/24/8788.full; also see latimes.com/nation/nationnow/la-na-nn-facebook-study-20140703-story.html#page=1 and theatlantic.com/technology/archive/2014/07/the-test-we-canand-shouldrun-on-facebook/373819.

[2] See [Anonymous Author], 'Stratfor E-mails Reveal Secret Widespread *TrapWire* Surveillance-System', 10 August 2012, at rt.com/usa/stratfor-trapwire-abraxas-wikileaks-313; Ben Doernberg, 'TrapWire: The Truth Behind the Hype', 12 August 2012, at storify.com/bendoernberg/test-post; and — if you can find it since it has been expunged from the web—the Abraxas Corporation's blurb re: the '*TrapWire*[™] Pre-Attack Terrorist Detection System for Protecting Critical Infrastructure', 26 September 2006, formerly at tdr.uspto.gov/jsp/DocumentViewPage.jsp?76610388/SPE20060927110512/Specimen/7/26-Sep-2006/sn/false#p=1 (deleted). Re: Philip K. Dick's concept of 'pre-crime', see 'The Minority Report', published in *Fantastic Universe* 4.6 (January 1956): 4–36, and Steven Spielberg's filmic version (Universal City: DreamWorks Studios, 2002).

[3] See leaksource.info/category/snowden (the most recent Edward Snowden interview at the time of this essay's composition, June-July 2014 — 'Inside the Mind of Edward Snowden', NBC News, 28 May 2014 — available at dailymotion.com/embed/video/x1xfc4b via nbcnews.com/feature/edward-snowden-interview/watch-primetime-special-inside-mind-edward-snowden-n117126).

[4] See Alan Travis and James Ball, 'Unprecedented New Powers in Surveillance Bill, Campaigners Warn: Prime-Minister insists Fast-Track Legislation will do No More than Confirm Existing Powers, but Privacy Groups Say Otherwise', *The Guardian*, 13 July 2014, theguardian.com/world/2014/jul/13/surveillance-bill-new-powers, and Pam Cowburn, 'The DRIP Myth List', 14 July 2014, openrightsgroup.org/blog/2014/the-drip-myth-list (also Cory Doctorow, 'Snowden: #DRIP defies belief', 14 July 2014, boingboing.net/2014/07/14/snowden-drip-defies-belief.html).

[5] Here again the sense of information/informe-governance, see Georges Bataille, 'Informe', *Documents* (1929), 382; cf. aphelis.net/georges-bataille-linforme-formless-1929 for an online version c/o Philippe Theophanidis.

[6] ‘The process[es] under discussion can be viewed as an information-transfer sequence involving a number of discrete steps: 1. recognition of the external signal by specific receptors on the cell-surface; 2. transduction of the extracellular signal within the membrane-system into an intracellular message or messages; 3. transmission of the intracellular message from cell-surface to cell-interior; 4. intracellular reception by specific receptor proteins; 5. modulation of the structure and activity of cell proteins by those intracellular receptor-proteins; 6. response of one or more elements within the cell leading to an alteration in cell behaviour; and 7. termination of the message either within the cell and/or at its site of generation’ (Rasmussen, 2).

[7] The term ‘coordinate’ in this context refers to the way political, economic and scientific governors (‘archons’) act in coordinate fashion to control response to a given externality (for example in the immediate aftermath of the 9/11 crashes in the United States, in which a shocking externality — or series of related externalities — introduces enough friction to catalyse large-scale coordinated responses from the major political, economic and intellectual regulatory powers). Within this prototypical model, the same externality can induce both increases in the respective regulatory capacities of each of the domains of governance, as well as enable overlaps so that domains can interact to regulate each other’s responses.

[8] The term ‘hierarchical’ refers to the way in which one of the domains of governance initiates response to an externality, thereby controlling the responses within the two other domains — the responses of these latter acting to supplement or enhance the initial response (for example the 2008 subprime mortgage crash in which the collapse of major financial institutions — partly caused by reductions in regulations for certain kinds of financial transactions in the years leading up to the crisis — prompted economic in the form of government bailouts and the political regulation of monetary policies by said government) .

[9] The term ‘sequential’ refers to the way in which information-flows in one domain generate information-flows in the other domains, which — taken together — determine overall response to an externality.

[10] Our ‘Mort à Discrédit: Otium, Negotium, and the Critique of Transcendental Miserablism’, originally written for the 2015 special ‘Bernard Stiegler’ issue of *Boundary 2: International Journal of Literature and Culture* at the invitation of its Guest Editor, forthcoming in the next issue of *Parrhesia: Journal of Critical Philosophy*. A rough-draft of the essay is available online at academia.edu/4184488. The present paper—above—also

draws from and is in many ways an extension of our Apps And Affect conference-presentation ('Planet of the Apps: Coming to Terms with our New Overlords') as well as our contribution to The Imaginary App anthology (eds. Svitlana Matviyenko and Paul Miller, Cambridge: The MIT Press, 2014: 230–250) which was based on the conference-presentation; the anthologised title being 'From the Digital to the Tentacular, or From iPods to Cephalopods—Apps, Traps, and Entrées-without-Exit', a rough-draft of which is available online at academia.edu/4184569 & academia.edu/4184524*

[11] Saint-Yves seems to have been well aware of how easily mythical sources are dismissed and how quickly visions of contemporary science dismiss those in and of scientific antiquity ('il n'y a aucune science réelle dans les temples antiques' he wrote at the outset of *La mission de l'Inde*, the last book of the 'Missions' he composed — completed in 1886 — albeit covering the most ancient period of the 'Missions' studied; a book which was published posthumously, following his own request, forty years after his death, by Dourbon-Ainé, Paris, 1949; for this passage, see page 4); these dismissals are in fact — even in the face of science-'fictions' — a type of willed blindness according to the Alveydrian outlook, a willed blindness that securely shuts the eyes from perceiving the ongoing application (i.e. dissemination) to-this-day of even the most ancient, obscure and outdated techniques, especially in cases where governance has greater and greater — multinational/worldwide — scope, and most pointedly in the globe-girdling operations of synarchic governance. 'Governance' here, once again, is a matter of missions — of emissions, of transmissions — and the 'missionaries' of its Spiritus Mundi[e] live in (or rather, through) the archono-archaeometrical hype, hyperstition and hypersynchronisation (re: hyperstition, cf. Delphi Carstens, 'Hyperstition', merliquify.com/blog/articles/hyperstition 2010 ; re: hypersynchronisation, cf. Stiegler, 2011, 43–60) of a pan-mediational — today, digital / fibrecultural / televisual — 'Hollywood' (here citing Kristol-via-Stiegler once again). Some have also called this, following after the 'military-industrial complex', the 'military-entertainment complex' see Tim Lenoir and Henry Longwood, 'Theatres of War: The Military-Entertainment Complex', Stanford University, 2002, online at web.stanford.edu/class/sts145/Library/Lenoir-Lowood_TheatersOfWar.pdf, along with Stephen Stockwell & Adam Muir, 'The Military-Entertainment Complex: A New Facet of Information Warfare', in the inaugural issue of this very journal: *the Fibreculture Journal* 1, 2003, online at one.fibreculturejournal.org/fcj-004-the-military-entertainment-complex-a-new-facet-of-information-warfare). This pan-mediational Hollywood/'Military-Industrial-Congressional'-Infotainment-Complex is in some sense[s] akin to the 'Cathode-Ray Mission' of David Cronenberg's early-'80s film Videodrome. The latter 'Mission'-qua-emission originates rather ambiguously (according to Cronenberg's film-script) in Malaysia or Philadelphia and/or Pittsburgh as the eponymous videodrome transmission; the locus of the Alvedyrian equivalent — which Saint-Yves calls 'Agartha', is presented as equally ambiguous: viz. high up in the heights of the Himalayas, but running up to these loftiest of its myriad gates from the cavernous confines of the subsurface/subterranean depths, which have pathways throughout the globe, including under America, as he states in his 1886 *La mission de*

l'Inde on the 28th page of the 1949 edition, where he writes of 'la surface et ... les entrailles de la terre l'étendue réelle de l'Agartha', 'sans parler de l'Amérique, dont les sous-sols ignorées lui ont appartenu [depuis longtemps]' (a passage that has always reminded this essay's authors of those pages from William Burroughs's *Naked Lunch* where 'evil' — which here we can invert so as to make it the interzone where, as Craig Mundie said, the televisual missionaries 'live' — is described as a radiation preceding its radiant pioneers. From the perspective of Saint-Yves's 'Agartha' or Burroughs's 'Interzone', 'America is not a young land' and Hollywood is indeed almost horrifying archaic: 'before the settlers, before the Indians', it was 'there waiting' — *Naked Lunch*, New York: Grove Press, 1959, 11). Hollywood, of course, makes use of materials both current and altogether ancient: its hype, hyperstition and hypersynchronisation appropriate and articulate the up-to-date and the archaic, as does Saint-Yves's multi-volume study of synarchy, and (according to Saint-Yves) any synarchic system as well.

[12] In his work he undertook an 'archaeology' (or if you prefer, an 'archonteleology') of synarchic regulation — the kind of 'archaeology' which Claude-Sosthène Grasset-d'Orcet would later take up in the essays that make up his *Matériaux Cryptographiques and Oeuvres Décryptées* (works collected and anthologised by Auguste Barthélemy & Bernard Allieu for Éditions les Trois R, Le-Mesnil Saint-Denis, 1976; cf. the original essays he published in *La revue britannique* from 1875 to 1890 — especially his essay 'Les Anciennes Corporations de Paris', published in the August 1st issue of 1884, which resounds in many ways of Saint-Yves). This 'archaeology' or 'archonteleology' culminated in *L'Archéomètre: clef de toutes les religions et de toutes les sciences de l'antiquité*, published posthumously in Paris, two years after the death of Saint-Yves, by Dorbon-Ainé in 1911.

[13] Rasmussen (and perhaps also his source, Victor Bers) appears not to have known of the Alveydrian precursor to his synarchic system — which was without question the case, more recently, when the multinational advertising and public-relations conglomerate WPP-PLC chose 'Synarchy' as the name of a new agency built to handle its Dell Computer multinational hardware and software account (see Rupal Parekh, 'WPP Settles on Name for Dell Shop: Synarchy Worldwide', published in the May 14 2008 issue of *AdAge*, online at adage.com/article/agency-news/wpp-settles-dell-shop-synarchy-worldwide/127081; in a follow-up to that article, published five days later, Parekh stated that the 'WPP Group's decision to choose Synarchy as the likely name for the new agency ... prompted anarchy in the blogosphere' — this because of the post-Alveydrian glut of conspiracy-theories that sprang-up around the term synarchy in the early 1940s, which culminate[d] after the turn of the millennium — i.e. post-2000 — in Lyndon LaRouche-style readings wherein synarchy is taken to be synonymous with fascism and neo-nazism; cf. Parekh, 'Blogosphere Abuzz with Criticism over Roots of Controversial Word', published in the May 19 issue of *AdAge*, online at adage.com/article/agency-news/wpp-s-synarchy-choice-sparks-sneers/127164).

[14] Hence the title of the present paper which alludes to this synarchic utopia, i.e. its underground undercurrent, its subterranean/subtextual schema.

[15] Wark, 2012: 81.

[16] Scott Bakker, *Neuropath* (London: Orion Books, 2008) and *The Three Pound Brain* (rsbakker.wordpress.com).

[17] Saint-Yves d'Alveydre seems to have developed his vision of Agartha, a.k.a. the depth/गर्त (gartha) that runs across the [w]hole surface/अगर्त (a-gartha; cf. Saint-Yves, *La Mission de L'Inde*, 1886; 1949, 26–27), from out of the work of Louis Jacolliot, whose 1876 *Législateurs religieux: Manou, Moïse, Mahomet* was (notoriously) a sourcebook for Nietzsche as well as for Saint-Yves. Agartha/Asgartha is first mentioned by Jacolliot in his treatise on *L'Initiation et les Sciences Occultes dans L'Inde et chez Tous les Peuples de L'Antiquité* (Paris: Éditions Lacroix, 1875), translated into English by William Felt under the title of *Occult Science in India and Among the Ancients* (London: William Rider & Son, 1919; see page 26 of that edition re: Agartha/Asgartha). With respect to its different transliteration-spellings, one can find references (for example) to Agarta, Agartta, Agartha, Agarththa, Asgartha, Agharti, et cetera , et cetera ('Agharta', for instance, was used as the title for what has been called 'the greatest electric funk-rock jazz record ever made' — in this case a 1975 record by jazz-musician Miles Davis; see twitter.com/seoirsethomaais/status/421935991155220480; the same title was used for the opening track of the drone-metal band Sunn O)))'s 2009 *Monoliths and Dimensions* record; Wikipedia lists a number of other examples, cf. en.wikipedia.org/wiki/agartha). See footnotes 32 & 34, above for more subtext[s].

[18] See IBM's definition: 'Predictive analytics helps your organization predict with confidence what will happen next so that you can make smarter decisions and improve business outcomes. IBM offers easy-to-use predictive analytics products and solutions that meet the specific needs of different users and skill levels from beginners to experienced analysts. With predictive analytics software from IBM, you can 1. transform data into predictive insights to guide front-line decisions and interactions; 2. predict what customers want and will do next to increase profitability and retention; 3. maximize the productivity of your people, processes and assets; 4. detect and prevent threats and fraud before they affect your organization; 5. measure the social media impact of your products, services and marketing campaigns; 6. perform statistical analysis including regression analysis, cluster analysis and correlation analysis' (<http://www-03.ibm.com/software/products/en/category/predictive-analytics>).

[19] Rachel Law, 'Datamania': a lecture presented at the Center for Transformative Media, Parsons: The New School for Design, New York City, April 14 2014.

[20] 'The numerical language of control is made of codes that mark access to information, or reject it. We no longer find ourselves dealing with the mass/individual pair; individuals have become dividuals, and masses, samples, data, markets, or banks' (Deleuze, 1992, 5).

[21] 'We are witnessing a convergence of what were once discrete surveillance systems to the point that we can now speak of an emerging "surveillant assemblage". This assemblage operates by abstracting human bodies from their territorial settings and separating them into a series of discrete flows. These flows are then reassembled into distinct "data doubles" which can be scrutinized and targeted for intervention'; Kevin D. Haggerty and Richard V. Ericson, 'The Surveillant Assemblage', *British Journal of Sociology* 51 (2010): 606.

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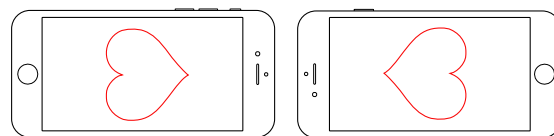
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FCJ-186 Hack for good: Speculative labour, app development and the burden of austerity.

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Abstract:

This paper analyses the rise of ‘hackathons’ – intensive code- and data-sharing events in which participants are inspired to accomplish specific challenges – to understand their role in the ecosystem for app development and the qualities of work they promote. Charting the transformation of hacking from dangerous activity to patriotic calling, it considers the popularity of civic hackathons as a means to rebuild the social in times of economic constraint. The work involved in the civic hackathon presents a new development in the history of sacrificial labour supplementing creative industries, a bridge between the ‘free labour’ foundational to the early internet and the practice of spec work in design. When the hackathon is advertised as civic-minded voluntarism, the labour is doubly discounted.

In this present crisis, government is not the solution to our problem; government is the problem. (Reagan, 1981)

At a time when the technology sector offers hope for a revitalised economy, particularly in the United States, the working conditions typical in this highly prized industry take on special

significance. This paper analyses the rise of ‘hackathons’ – code- and data-sharing events that inspire participants to accomplish specific challenges in a condensed time frame – to understand their role in the ecosystem for app development and the qualities of work they promote. Hackathons are emblematic of broader trends in high-tech labour in that they reflect the difficulties, opportunities and compromises young workers face in the wake of the Global Financial Crisis. They are a symptom of a broader transformation affecting career preparation and training as stable paths for recruitment give way to the velocity of dynamic networks. Hackathons’ growing popularity can be attributed to a range of factors, including: their effectiveness as a recruitment tool for start-up ventures and established companies; their efficiency in providing low-cost development and design prototypes; and their ability to test individuals’ capacities in a high-pressure setting. Hackathons enable aspiring professionals to demonstrate technical skills and immaterial qualities of employability (Boltanski and Chiapello, 2007; Gorz, 2010) in a competitive job market that skews young (Lu, 2014). They further provide a venue for those on the periphery of paid employment to begin the ‘netWORK’ (Nardi et al., 2002) that will be crucial in an adhoc, flexible, portfolio-driven career.

It is perhaps unsurprising that hackathons, app jams and coding camps have taken hold in a context of fiscal austerity. In the United States, billowing costs for college education, a decline in what is vaguely termed ‘middle class jobs’ and the growing volume of anti-debt campaigns all affect the worldview of students and others seeking a stable career foothold. [1] The US recovery in fact compares well with other parts of the world, most notably Europe. Still, the hollowing out of ‘good jobs’ – understood as salaried positions with benefits – is a similar one-two combination of precarization and *déclassement* (Roggero, 2011: 12). Added to this is the steady media appetite for Silicon Valley success stories with their anti-establishment, risk-taking allure (Neff 2012): *Time* Magazine’s (2010) Top 10 billionaire college drop outs names Bill Gates at No. 1, Steve Jobs No. 2, and Mark Zuckerberg No. 6. These tech warriors’ examples provide ripe material for VC stalwarts urging young people to abandon their degrees for the more lucrative and challenging ‘hard knocks’ school of dot.com business. [2] As Gideon Lewis-Kraus (2014) writes on the latest Silicon Valley goldrush: ‘Starting a company has become the way for ambitious young people to do something that seems simultaneously careerist and heroic’. The ‘killer app’ fairytale promotes belief in a celebrity lifestyle allegedly available to young people brave enough to ditch their studies and gamble their future on a start-up.

While each of these issues deserves further inquiry, the interest explored in this paper is the amount of work currently donated in the guise of civic or ‘issue-oriented’ hackathons (Lodato and DiSalvo, forthcoming) in the name of economic recovery. Unlike corporate hackathons, which favour the production of technical solutions for market opportunity, civic hackers put social questions at the centre. In the work of Code for America

(codeforamerica.org), Random Hacks of Kindness (rhok.org) and events like the National Day of Civic Hacking (hackforchange.org), industry sponsors, public-private partners and NGOs rally thousands of participants to hack for a good cause [3] – typically, a new app or platform arising from the repurposing of accessible data sets. In the course of a day or a weekend, hackers enjoy networking, schmoozing and information sharing with well-connected sponsors. This fleeting assembly of tech workers trades off the pleasures of social computing and hacking's informal conventions (Coleman, 2013).

Civic hackathons are marketed as a new form of community service, right down to the nomenclature of 'code brigades' that evoke earlier traditions of national duty. Not just an exciting entry point for computer scientists to establish influential contacts at the beginning of their work lives, hackathons are an empowering method for motivated individuals to get involved in their local community and make a difference to the lives of others. A growing number of stories testify to the role of hackathons in creating job opportunities that did not exist otherwise (Ancona, 2014).

But given the already existing pressure on young people to engage in career-bolstering 'free labour' (Terranova, 2000; Hesmondhalgh, 2010), the notion of voluntarism underwriting the civic hackathon is a development to be welcomed cautiously. Hacking for good fuses the youthful energy of Obama-era digital participation with Silicon Valley's own Peter Pan triumphalism. The youth-centrism of this mode of participation is captured in the words of Code for America founder, Jennifer Pahlka, who suggests that 'this generation... assumes all problems are, if not solvable, at least hackable' (in Halper, 2013). Positioned as budding entrepreneurs, young hackers are encouraged to take personal responsibility for the decline in civic resources and amenities, including the very educational facilities that could be used to 'teach kids to code' (code.org). Civic hackathons are positioned as rational investments of time and labour, a socially beneficial and distinguishing extra-curricular activity in the cut-throat market for viable, fulfilling and ongoing work.

There are many advantages to the boom in civic tech – among them, the opportunity to reverse engineer a skills gap in digital literacy brought about by the shift to cloud computing and the Internet of Things. What remains questionable however is whether hacking can or should be relied upon to ensure reliable delivery of the political, technical and affective infrastructure of major cities. In the evangelist's view, 'Governments need to officially recognize and partner with outside hackers and technologists' by providing 'high quality open data and other "raw materials" for hackers to create 'new solutions' (Headd, 2014). Missing in this appeal is the pragmatic reality that local governments have few resources available to devote to such a quest. As we will see, one reason civic hacking is so attractive to advocates and their recruits is because the current system of governance

and administration in the US setting in particular is broken by admission. The broader issue that gets lost in the civic hacking debate is whether we are comfortable with a situation in which citizenship and employment sit together as potentials to be actualised through a short-lived event dominated by an unrepresentative participant population.

The purposeful association of coding with voluntarism places hacking among the longer list of examples of donated, portfolio-filling, 'sacrificial' labour in the creative industries (Ross, 2000). In addition, the ideology of entrepreneurialism underwriting these events implicates participants in a political manoeuvre that celebrates private solutions to public problems. Civic hackathons invite renewed attention to the appeal of the civic in shepherding an industry for young people's labour that takes a lack of pay for granted (Perlin, 2011; De Peuter et al., 2012). Hackathons demand better distinctions between enterprise, industry, governance and government, and how each of these terms come to be associated with patriotic duty. This paper is an initial attempt to address these issues independently of their casual conflation.

Hacking Becomes Hegemonic

It takes some historical perspective to appreciate the shift in mindset that has seen hacking move from the margins of society to the mainstream. Indeed, my interest in the term is precisely its capacity to inhabit both of these locations simultaneously. [4] In civic hackathons, citizens are openly welcomed to hack their government, in an appropriate display of political affect. 'You don't accept the world as it is,' were the welcoming words from Los Angeles Mayor-elect Eric Garcetti at Hack for LA 2013. [5] And yet, as we have seen repeatedly with hackers who do follow this directive, there is such a thing as too much autonomy in the act of liberating data. Edward Snowden and Julian Assange represent the wrong kind of civic hacker because their ideas of transparency have proven too radical; their notion of informed citizenship breaches establishment thinking on appropriate access and publicity (Gregg and DiSalvo, 2013). From one perspective, of course, these whistle-blowers' actions epitomise the demand for accountability in government; their advocacy has been crucial in revealing the extent of government surveillance beyond citizens' knowledge and consent. From another view, the same actions typify the open cyber-ethic gone wrong: a form of celebrity-seeking heroism that regards technical superiority as a moral force guaranteeing elevation from common law. [6]

What hacking means, both now and in association with its pasts, involves perpetual debate over legitimate forms of expertise, access, authority and protocol (Nissenbaum,

2004). In Coleman's (2013: 3) recent definition, hackers are 'computer aficionados driven by an inquisitive passion for tinkering and learning technical systems, and frequently committed to an ethical version of information freedom'. This version of hacking certainly accompanied the latest app-fuelled tech bubble, whether in the life 'hacking' optimisation techniques in various quantification devices or the DIY ethos of the so-called maker movement (Hatch, 2014; Lindtner et al., 2014). As 'hacking' is enshrined in the parking lots, meeting spaces and wallpaper of multi-million dollar tech firms (Kovach and Goodman, 2013), as swathes of the Californian landscape are carved up and signposted with roads called Hacker Way (the route to Facebook's Menlo Park headquarters), as hacker residencies are advertised in municipal libraries and art galleries, and as chip companies invest in hackathons to motivate summer interns, we see multiple forms of evidence that hacking has become a cherished economic activity. Hacking's self-directed qualities embody the desirable traits of today's model employee.

In earlier times, to 'hack' meant to attack – often with a sharp implement! – and it is this meaning that still appeals in the tech industry's relentless quest to 'disrupt', 'conquer' and 'win' new markets (Losse, 2012). Conversely, to *be* a hack once indicated an individual with dubious qualifications or credentials, a term of abuse for someone whose poor skills and deceitful trade toyed with trust. It is a substantial etymological accomplishment that the term 'hack' no longer signals a *lack* of professionalism so much as a practice that may benefit one's professional pedigree. Even very recently, distinctions between 'white' and 'black' hat hackers drew lines between professional information systems analysts and individuals seeking notoriety by breaking security protocols and revealing flawed code. But when Facebook – perhaps the most successful company founded by a self-designated hacker – hired 'Thrax' as the result of a successful breach of its system (Losse, 2012), the elevation of subversive hacking to workplace recruitment strategy was complete. In this case, and presumably many others without the same publicity, illicit hacking confirmed appropriate disposition for an industry enamoured with its own rule-breaking eccentricity.

Hat imagery nonetheless helps to appreciate hacking's place in the broader US cultural imaginary. For decades, white and black hats were the nominal index of good versus bad in Westerns – an easy measure of the righteous protagonist demanding audience sympathy. The rugged cowboy predates the rogue hacker as the iconic renegade individual who triumphs over social convention to secure victory for what is right and just. This is one lineage that links the experiences of Edward Snowden, Julian Assange and Pentagon Papers leaker Daniel Ellsberg: in each case, the liberation of data and the public perception of the hacker as hero or villain depends on contingent notions of patriotism, responsibility and duty.

In the tech industry, hacking's further nuance is to embody core principles of start-up and venture-capital wooing enterprise. It is not just access to information that is heralded as 'good' but the conviction that especially talented individuals can do more with data than those officially charged with its curation. As we see in the case of accommodation providers like AirBnB, or the taxi service spin-off, Uber, app development typically proceeds on the premise that autonomous access to resources is superior to any state-regulated method. The liberal ideology shared by app developers and various hacking traditions is the belief that technology builds a non-partisan bridge between competent, self-motivated, rational actors (Coleman, 2012; Ames 2013). This 'entrepreneurial citizenship' (Irani, forthcoming) enacted in app development is increasingly attractive to local, state and federal governments in times of enforced budget constraint. Civic hackathons enable individuals to claim entitlement to public data and create innovative uses for their circulation in spite of limited municipal resources for information gathering, storage and retrieval. Hacking ameliorates the otherwise cataclysmic cuts to government spending on civic services like libraries, public schools and other repositories that enable data sharing in many communities. In its parasitic nature, the process gives citizens an opportunity to believe that enough self-motivated individuals can stave off the consequences of fiscal decisions made by elected governments.

Civic hacking also acknowledges that data literacy is now vital for effective economic participation even while pedagogy and training for such literacy is unequally distributed according to gender, age, geography and race. Learning to code is increasingly recognised as a necessary supplement to the inadequacies of a state system of education focused on testable metrics at the expense of creative and employable skills. This is the rhetoric that has attracted so much corporate investment in initiatives like *Make: Education* (makered.org). Through this organisation, community groups, volunteers and start-ups provide infrastructure and opportunities for kids in poorly serviced school districts to explore science, art and other creative pursuits. In championing data access and dissemination, and in promoting creativity in education, civic hacking promotes DIY skills acquisition as the appropriate response to the decline in training and services once provided by the state. The National Day of Civic Hacking shows this happening at a grand level.

Hack For Change

Hosted in over 70 U.S. cities in June 2013, and 103 locations in 2014, The National Day of Civic Hacking is billed as an occasion to 'bring together citizens, software developers, and entrepreneurs across the nation to collaboratively create, build, and invent, using publicly released data, code, and technology to solve challenges relevant to our neighborhoods,

our cities, our states, and our country' (hackforchange.org). Over the course of 48 hours, hundreds of ideas and thousands of lines of code are generated, debated and exchanged in synchronicity. A handful of winners are selected at each site, with media coverage, corporate seed funding, and a trip to the White House among the spoils. The language used across the weekend is one of problem solving through technical innovation. New services for assembling, analysing, and accessing data can be tested and implemented by hackers, while start-ups seeking exposure can gain free publicity when their products are used for this purpose. This unique combination of crowdsourced labour and public relations opportunity benefits businesses and potential employees alike, as witnessed in the 2013 Hack for LA. Scopely's representative appraised the scene adroitly by praising the crowd – 'You guys are AWESOME for giving up your weekend!' – and concluding his sponsor's pitch with a blatant plug: 'We're hiring.'

At the same event, newly elected Mayor Eric Garcetti deftly maneuvered the opening of the event to create a press opportunity for his forthcoming term, an injection of boosterist rhetoric anticipating the city's plans to transform Venice Beach to Silicon Beach. Garcetti's speech was revealing for what it admitted about the flaws in the very office he stood poised to take over. Lauding the hackers, he acknowledged that anything they did that day would matter, because the point was 'you didn't make it worse.' This was Garcetti's idea of a joke, a funny yardstick for government and civic participation. But it was also pivotal. It recognised the challenges facing LA as a city. In one breath he championed the need to appoint a CTO and CIO in his term, admitting that cities are now best run as corporations. He then pointed to the simplest services a city should be able to provide and doesn't. 'We still need to pave that pothole with asphalt,' Garcetti said, 'but knowing the pothole is there' is something hackers accessing open data can fix.

In his remarks, Garcetti claimed he wanted LA to be 'the best place in the world to hack'; the event could be the birthplace of 'the next tech CEO.' In his term, he wanted every kid to have access to coding classes in high school, because education isn't about preparing people for manufacturing jobs anymore. The winners of the hackathon were promised City Hall itself: 'We're going to open up the doors and the departments... to build a city of Angels for everyone.' In these rhetorical strains, the idea of transparency is very easily transported from open data to an open political process and an improved democracy in general.

The 'Rosie the Riveter' image advertising the National Day of Civic Hacking in 2013 is a clear instance of recruitment strategies drawing on ideals of civic service, patriotism and duty. The title's red, white and blue etching positions hackers as inheritors of a tradition of patriotic service required in times of war. As the United States joined World

War II, budgetary spending on the military and the economic impact of committed troops demanded a new perspective on employability, capability, and resources. Rosie the Riveter was used to motivate women to join the ranks of labour at a time of crisis, her feisty fist clench an icon designed to build morale.

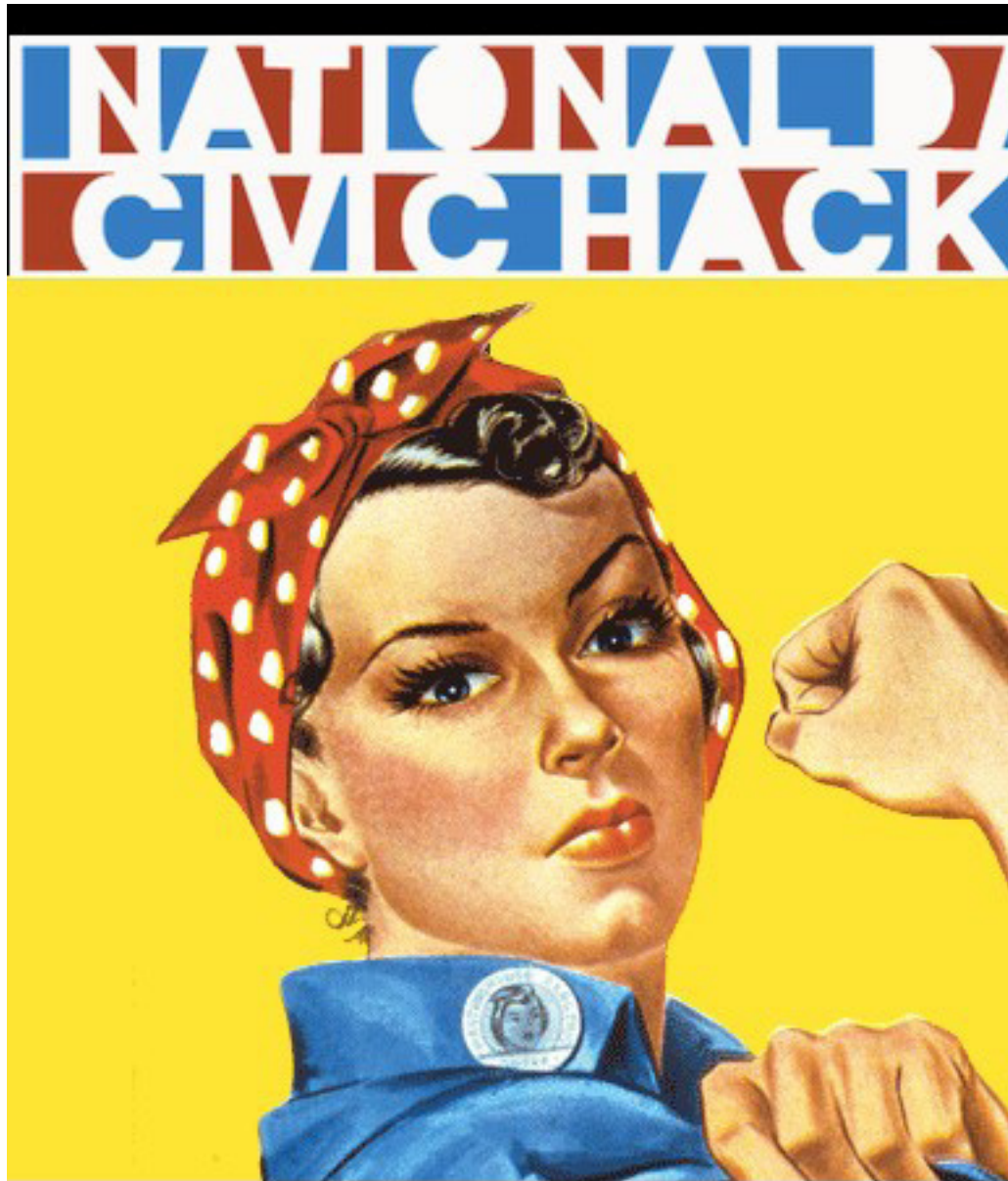


figure 1 : Rosie the Riveter reappropriated for NDOCH 2013.
(source: hackforchange.org)

Today, the 'We can do it!' attitude dovetails with the 'Yes we can!' optimism of Obama's Presidency to continue a legacy of national service for contemporary times. In this latest

fiscal crisis, civic hackathons mobilise a reserve army of labour to enhance service delivery for a cash-strapped state. The National Day of Civic Hacking reanimates ideas of civic duty ('your country needs you') to offset the consequences of war spending in the present. Code for America spreads this nation-building charter, with code 'brigades' branching out across the country in a display of missionary zeal (Halper, 2013). Code for America badges ambassadors for a state and a democracy that is everywhere under-resourced. Hacking is both a patch for government and a distraction from other patriotic commitments, particularly those that have prioritised military spending over education in consistent federal administrations.

It remains to be seen whether code brigades and specialist non-profits dedicated to spreading tech literacy echo or arrest the decline of earlier traditions of civic participation in US life (Puttnam, 2000). This is the focus of ongoing research (e.g. Schrock, 2014). For now, the hackathon provides a venue for the 'democratic personality' to flourish (Turner, 2014) and for the production of subjectivities that accept leisure time as an occasion for productivity (Crawford, forthcoming). At the same time, civic hackathons prove to be one more instance of the computer scientist's approach to the social, a view that typically avoids analysis of the macro political conditions inherited in software, hardware and code. By narrowing attention to issues that can be solved in a compressed timeframe, critical questions of priority and equity are left aside. Challenges are readjusted in real time to suit who and what is at hand (Lodato and DiSalvo, forthcoming). As an enactment of civic intent, hackathons parochialise the ambition of democratic participation to topics that attract the data and technical means for impact in the course of a day or a weekend. [7] The novelty of civic hacking lies not in its structural political impact, then, but in the lessons it holds for contemporary labour.

Labour In The Hypothetical

The language of civics, service and duty provides a convenient means by which the sacrificial labour of creative professionals can be encouraged and incorporated by business. If part of the hackathon's appeal is the possibility of facilitating the next 'killer app', in reality, few of the ideas emerging from the event's inflated conditions actually survive long-term. Accelerator attention may follow successful performance at a hackathon but this does not guarantee a viable business in the long run. [8] In hackathons what gets built rarely works, even in the case of apps that win prizes and publicity in the timeframe of the event (DiSalvo et al., 2014). Instead, the meet-ups produce an archive of speculative possibilities – what Irani (2013) calls their business-card, 'promissory' function. The work conducted during the week or weekend acts as an illustration of what future work *might*

entail. As is the case with other practices of speculative design (DiSalvo, 2012: 111), hackers test, prod and wonder, creating 'new imaginative instantiations of what might be.' And yet, the artificially heightened tempo of the hackathon necessarily curtails these possibilities.

In the 'manufactured urgency' (Irani, forthcoming) of the event, productivity is performed in concentrated bursts, with participants expected to 'hit the ground running' and drive bodies to extremes. This work experience assumes the possibility of total devotion to the task for the period allotted, a world without interruptions or competing demands on attention. Hackathons mirror other versions of 'media work' (Deuze, 2007) that associate youth with vigour, commitment and creativity. Power relations and other questions of politics and hierarchy are downplayed through conditions designed to maximise concentration, creativity and seamless 'flow' (Csikszentmihalyi, 1990). [9]

In these ways, hackathons combine qualities of both the 'free labour' (Terranova 2000) foundational to the early internet and the practice of spec work in the field of design. As Kennedy (2013: 228) explains:

Spec work, short for speculative work, involves people producing goods, usually cultural goods, without a guarantee of getting paid. For some designers, the most troublesome manifestation of spec work is the spec work competition, which brings amateur and professional designers together in competition with each other for payment for a design job which they all undertake.

Hackathons share these aspects of spec work in that they assemble variously qualified groups of participants together in a competitive process that results in some people being paid for their work and not all. Even when there are prizes, cash rewards are regularly subject to the whims and priorities of event sponsors. The in-built competition characteristic of hackathons also trades on the notion of crowdsourcing – 'the outsourcing of tasks historically carried out by paid employees to the collective labour of a group of volunteers' (Kennedy, 2013: 229). Of course, civic hackathons mobilise an additional meaning to the term volunteer: when the hackathon is advertised specifically as a new kind of voluntarism, the labour involved in developing an app design or prototype is doubly discounted. We are no longer simply describing the willing amateur who gives away skills and labour for the love of a craft; the coder gives away time and skills that are designated as beneficial to others. The question raised by civic hacking's version of voluntarism is: who can afford the time to give away their labour? Additionally, we might ask, should those who can afford to give away labour really be setting the priorities for civic infrastructure?

As Kennedy writes, engaging in spec work has the effect of devaluing design, because ‘only part of the workforce involved in the job’ is paid. By extension, hackathons risk devaluing the professional fields their young participants are vying to enter. One suggestion Kennedy favours in the design context is a clear distinction between participation in spec work initiatives and *pro bono* ventures. This means ‘donating professional expertise, or undertaking professional work, in the full knowledge that no payment will be received (in contrast to spec work, where participants hope to be paid)’ (2010: 242). *Pro bono* work is explicitly stated as being ‘for the public good’, and is part of a longer tradition of other-oriented professional service. However the concern with civic hackathons is that, if participants skew young, and discount their earnings at the very beginning of their career, will these aspiring professionals ever have the luxury of such a choice? By the time they come to appreciate how much work they have given away for free, will it be too late to demand professional recognition, or the correct proportion of paid vs. unpaid work?

Civic hackathons induce what Hesmondhalgh (2010) might classify as morally acceptable free labour – work that is donated for charity – but in doing this usher forward the likelihood of a reliance on such labour at scale. Just as the contribution of unpaid interns is now acknowledged as necessary for certain industries to function, civic hackers ‘learning to labour’ (Willis, 1977) in informal settings create an industrial reliance on donated work in the process of receiving professional training. Paul Willis’s account of working-class Birmingham ‘lads’ is a fitting analogy to the experience of today’s young hackers who, ‘for a specific period in their lives... believe they dwell in towers where grief can never come’ (Willis 1977: 107). But as Willis concluded, working class culture ‘is not generally one of celebration and mastery. It is basically one of compromise and settlement: a creative attempt to make the best of hard and brutalizing conditions’ (1977: 107). Civic hackathons are a training ground for the grunt work of the knowledge economy, with its similar sequence of brainstorming, protracted periods of autonomous, highly mediated team-work, which culminate in a presentation for an assessing audience. A set of skills is legitimated and coerced by the form, including confidence, self-expression, mastery and composure. And at the end of the day, in hacking as in business, everything comes down to the effectiveness of the pitch (Gill, 2010).

Hackathon participants thus learn to simulate genres of middle class professional accomplishment but don’t ever progress to a position of owning the infrastructure, influencing the budget bottom line, or changing laws that distribute resources. Coders and data evangelists valiantly carry out challenges issued by others. To use De Peuter’s (2011) terms, civic hackers are an archetypal ‘pre-cog’ – a ‘cognitariat’ (Berardi, 2009) that is forever in the making. The cognitariat is the class whose careers involve:

self-driven, passionate commitment to work; willingness to work for nothing; perpetual and personally financed reskilling; habituation to material insecurity; obsessive networking... [and] bold enterprising behavior. (de Peuter, 2011: 421)

Hackathons illustrate this precarious experience, a work life that is flexible, mobile and adhoc. Those with the skills and smarts to withstand the accelerated conditions of app production thrive on the entrepreneurial confidence that comes with established social and technical networks. For the many who are less materially equipped for the evacuation of workplace protections and the withering of social infrastructure and services, the future for economic and civic participation is less assured.

Civics Without A State

Appealing to the individual at the expense of the confining administrative state, civic hackathons update the Reaganite philosophy of self-governance for a new, technologically literate generation. Civic hackathons embody an intractable contradiction, inviting hackers to deploy their superior mastery as supplement to the very education and political systems designed to ensure equitable access to information, training and skills. While there are benefits to the DIY citizenship encouraged in these events, they are near-sighted to the extent that they do not stem the tide of decreased funding for civic services and infrastructure. Hackathons' partial improvement of civic services neither disrupts government nor overcomes wider citizenly disenchantment with the representative nature of US democracy. When Mayor Garcetti urges hackers to report freeway potholes by smartphone, he acknowledges the limited scope of DIY governance. Developing a platform to enhance knowledge of already existing but insufficient infrastructure is a parasitic form of assistance in the mode of the volume boost. It resembles the profiteering of social media platforms that disseminate the high quality journalism that is another employer's responsibility to source and fund.

Civic hackathons succeed by feting, entertaining and marginally rewarding a specific demographic that is attracted to the vision of 'productive freedom' (Coleman, 2012: 3) that has been hacking's historical provenance. Such a practice appeals to an elite group of individuals who recognise themselves as agents of their moment (Streeter, 2014), whose proficiency equips them to carry the burden of civic duty and deliver services where an incompetent government fails. For the many US workers without a direct path

of entry to these skills, and the productive economic subjectivities they enable, there is little likelihood that civic hacking will bring much cause for hope. In fact, the point of this discussion has been to question whether the privileges of this entrepreneurial mode of employment are really so clear.

Hackathons' apps-to-riches appeal shows all the signs of 'venture labor' (Neff 2012) for a new generation. A decade ago, young web pioneers took unstable jobs in an unproven industry as a way of staking out credibility. In Neff's account, embracing risk was an act of autonomy and distinction for aspiring professionals looking to justify the choice to give away their labour for free. Risk was regarded as a rational financial and affective investment in the hopes of delayed payoff. For today's civic hackers, fresh from the trauma of a major economic meltdown, it is not personal risk that motivates so much as the notions of service and patriotism so carefully targeted towards them. The affront is that these other-oriented directives for free labour translate to the same experience of precarization: incorporating the sacrificial labour of the young, powerful interests posit career training in the nostalgic strains of voluntarism. This recruitment effort deflects attention not only from the dwindling infrastructure of state-based support but from the declining middle class itself, which is also to say, the worrying economic transformations that an unregulated market encourages.

An optimistic reading of hackathons would see their popularity as part of a demand for more socially-responsible, autonomous and collaborative workplaces. Hackathons energise workers by delivering ownership of challenges to those with both the technical competence and enthusiasm to deliver. This DIY philosophy is an important counterforce to the dampening effects of bureaucratic structure on creativity, and has significant promise as a means of revitalising the innovation pipeline for large firms. That said, the forced conviviality of teamwork culture – a sociality that is 'both autonomous of capital and captured by it' (Andrejevic in Hesmondhalgh, 2010: 275) – exploits the good will of hackers who are inspired by the tech industry's vocal ambition to change the world. The gamification of political lobbying taking place in civic hackathons encourages a myopic engagement with the multiple and intersecting factors affecting individuals' access to information and education. It is a fair weather approach to social activism.

Hackathons provide momentary exercises in speculative citizenship (DiSalvo et al., 2014) – experiments in democracy that strive towards a reconfigured relationship between citizens, the state and capital. The downside is that the young people they harbour only ever enjoy theoretical wins. Their experience of work and of politics is growing distant from the models for self- and civic governance enjoyed in earlier times. These models include the collective power of labour and citizenship as viable political identities. Learning to

labour for free risks normalising the solitude and insecurity of perpetual debut. To escape this fate, today's hackers would do well to recognise their condition as living labour, as workers whose already substantial debt marks them as the indentured cognitariat of our time. Hackathons are not 'a space to await entry into the labor market or a channel for upward mobility', to cite Rogerro (2011: 157). They are instead one of the most likely places to witness work taking place 'in a present without anticipation' and perhaps, with encouragement, the revolutionary potential in realising 'the immediacy of one's own productive condition' (*ibid*).

Biographical Note

Melissa Gregg is a Principal Engineer at Intel Corporation researching the future of work. Her books include *Work's Intimacy* (Polity, 2011), *The Affect Theory Reader* (Duke UP, 2010), *Cultural Studies' Affective Voices* (Palgrave 2006) and the forthcoming* *Counterproductive: A Brief History of Time Management** (Duke UP). Recent publications have appeared in *The Atlantic*, *Interactions*, *IEEE Computer Magazine* and *Television and New Media*.

Notes

[1] College education costs have escalated over 70% relative to wage rises in some US states (Sanchez, 2014). Andrew Ross (2014) considers the relationship between student debt and the role of credit in US society more broadly in his account of the Debt Jubilee arising out of Occupy Wall Street.

[2] A case in point: In 2011, Peter Theil announced '20 under 20', a \$100,000 fellowship for young people to gain experience and mentoring in the pursuit of a new business opportunity provided they left university for the experience.

[3] My title for this paper draws on the name of an Intel corporate education initiative, 'Code for Good', one of the key partners for the National Day of Civic Hacking. See <https://software.intel.com/en-us/codeforgood>. As I hope is clear, my reflections neither advance nor disown a unified view on civic hacking as defined by Intel; in different parts of the company, hackathons serve different purposes and give rise to a range of experiences

beyond those identified in this discussion.

[4] In what follows, I show how hacking is ripe for the kind of analytical attention that, at an earlier moment, the Birmingham Centre for Contemporary Cultural Studies applied to the term ‘mugging’. In *Policing the Crisis* (Hall et al, 1978), the politics of a new era were shown to have been transduced on to the figure of the mugger, whose actions offered an occasion for moral panic and thus an outlet for the anxieties of a particular class formation. Invoking the word ‘mugging’ in popular news coverage was to deploy a signifier that summoned a complex history of class and race relations already attached to the term in its North American context. Today, the power dynamics of the digital age are efficiently accommodated in the term hacker, even if the class and racial make-up of the agent is entirely different from the black teens of Thatcherite Britain.

[5] This paper draws on an 18 month period observing hackathons, hackathon organisers, sponsor meetings and research presentations in my role as an Intel Blue Badge employee and as Principal Investigator for the Intel Science and Technology Center for Social Computing. Some of the insights on hackathons I draw on in this paper are the result of internal company research; for details on generic features and affective qualities of hackathons I am indebted to Carl DiSalvo and Thomas Lodato, whose contributions are acknowledged throughout.

[6] Films such as the recent *Citizenfour* (Poitras, 2014) suggest that both perceptions may be true.

[7] The exception that proves the rule in this argument is the VC-backed lobby group, Fwd.US, whose immigration hackathons have been rolling in cadence since late 2013. In this instance, it is precisely the recourse to serious financial resourcing that provides the infrastructure to sustain a broader and highly ambitious campaign for thoroughgoing legislative reform. The FWD.US movement is the flipside of Obama’s Dreamers, and trades on a similar affective appeal that migrants should have the right to work and participate fully in productive economic and civic life. FWD.US’s billionaire donors enjoy the combined cultural and financial capital to influence government priorities, which marks its difference from other civic hackathons that adopt a bottom-up strategy to source participation and interest.

[8] In the period documented in this paper, Intel’s Cultural Dynamics Lab concluded after

a number of initiatives and experiments that hackathons were not a reliable source for product development or business innovation.

[9] Rosalind Gill (2007) shows that these conditions that typify the rhetoric of creative industries work perpetuate the exclusion of women among other minorities. A novel account of the labour involved in securing childcare for a hackathon is Andrews (2014).

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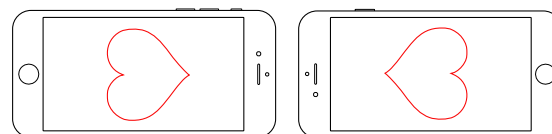
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FCJ-187 The Droning of Experience.

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Abstract:

The figure of the drone is invoked as a contemporary avatar for the logics of distributed networking at a distance, automated sense-making and automated response associated with interactive platforms more generally. The case of affective apps is forwarded as an example of the generalised logic of 'droning' in the register of control via the modulation of affect. The argument focuses on examples of data mining in the affective frontier: apps that generate data about affective states in order to more effectively categorise and target users. The conclusion argues for a reconfigured approach to questions of alienation as one way of critiquing drone infrastructures and the logics of droning.

Recent debates over the fate of automated weaponry raise the question of pre-empting pre-emption: might it be possible to thwart the seeming ineluctable development of so-called 'killer robots,' that can respond to perceived threats more efficiently and rapidly than humans? The processes of disarmament and pre-emption collided in the 'bold action' of a top United Nations official who issued a call to ban the ominously-acronymed Lethal Autonomous Weapons (LAWS). 'You have the opportunity to take pre-emptive action and ensure that the ultimate decision to end life remains firmly under human control,' UN Director-General Michael

Moller told the participants in a 2014 conferenced on killer robots (Agence France Presse, 2014). The difference between LAWs and other lethal weapons lies in the command decision – that is, the final determination regarding whether to fire (bomb, destroy, etc.). If the command decision always incorporates a human at some point in the command chain, the promise of the LAW is to codify priorities so that the human element can be programmed in advance (and thereby bypassed). Suggestively, automated application has long been a fantasy of the law – that is, the prospect that a law might carry within itself the principle of its application, thereby obviating the need for the all-too-human category of judgement. LAWs, in a sense, literalise the fantasy of automated application, by trying, sentencing, condemning and executing all at once.

In more general terms, the promise of LAWs recapitulates that of frictionless automation in which the resistance that slows down decision-making processes takes the forms of humans themselves. We, in all our sluggish, fleshly, humanity, are gumming up the machine by preventing it from operating as efficiently as it might otherwise do, freed from the vagaries of our desires and the hesitations of our decisions. The fantasy of friction-free capitalism outlined by Bill Gates (1995), for example, is one in which intelligent ‘agents’ speed up the consumption process, seeking out information about products, prices, and eventually about human desire so that it can be filled automatically. This same fantasy underwrites current developments in predictive analytics designed to distribute goods to particular locations before they have been ordered, to know what consumers want better than they themselves do. The prospect of LAWs envisions something similar – a process of automated warfare that can take place in an ongoing fashion at a pace that outstrips the limitations of human command and control. The friction-free conceit behind a LAW is that it can ‘outperform and outthink a human operator’ (Foust, 2013). As one university researcher put it in what sounds like a parody of contemporary Gradgrindianism:

If a drone’s system is sophisticated enough, it could be less emotional, more selective and able to provide force in a way that achieves a tactical objective with the least harm... A lethal autonomous robot can aim better, target better, select better, and in general be a better asset with the linked ISR [intelligence, surveillance, and reconnaissance] packages it can run. (Foust, 2013)

The same logic can be turned around on humans themselves through the process of what might be described as self-droning: finding ways to transform humans into networked, sensing devices. Consider, for example, the HSARPA-funded cortically coupled computer vision system that seeks to make human image scanners more efficient by tracking brain responses in real time. The goal is to make intelligence analysts, among others (including shoppers, of course), more efficient by bypassing the need for conscious recognition.

The program's lead researcher, Paul Sajda, claims to be able to show images of drone footage or surveillance satellite photos to analysts more rapidly than they can consciously process in order to use their brains, hooked up to EEG monitors, as a detection device. The resulting technology, according to researchers, can at least triple search speeds. Sajda describes it this way: 'The system latches on to individual perceptions and trains the computer to know what the user means by "interesting"' (Daley, et al, 2011). Building on this research, The U.S. Army is reportedly interested in creating a direct interface from drivers' brains to automated forms of reaction and response.

A driver might see something peculiar on the roadside. Maybe it is an improvised explosive device. His C3Vision headgear would register the brain waves associated with the suspicious object and inject them into the vehicle's driving system. When the system sees other things out there that look similar, it would automatically evade them. Likewise, security guards might use such gear to spot suspicious activity on surveillance video. (Daley, et al, 2011)

Related research explores the ability of such systems to improve response times in jet pilots: the construction of LAWS by other means.

Unsurprisingly, in our convergent world, the technology is also envisioned to have consumer applications: a miniaturised, wireless version of the device might be used to identify consumer items or even specialty shops that catch your fancy as you walk down a city street. 'Just a quick glance at a dress in a window, for instance, might elicit a neural firing pattern sufficient to register with the system. A program could then offer up nearby stores selling similar items or shops you might want to investigate' (Daley, et al, 2011). It sounds like a ready-made app for an EEG-equipped Google Glass: the promise to realise the fantasy that neuromarketers have been pushing: a direct feedback system routed through the affective register to bypass self-conscious thought altogether. If Bill Gates envisioned automated consumption via 'intelligent agents' that determined our tastes and shopped for us, the C3 system promises to turn us into our own intelligent agents by bypassing the forms of conscious reaction and deliberation that threaten to introduce 'friction' into the system.

The goal of aligning these examples with one another is to highlight a shared logic that coalesces around a version of experience that literalises the post-psychoanalytic disentanglement of language and desire. A particular version of the materialisation of desire – (its subtraction from the realm of language and therefore its 'post-humanisation') – fits neatly with the forms of monitoring and manipulation envisioned by the coming

generation of affective applications and platforms. What model of experience corresponds to this reconfiguration and generalisation of desire? The work of Ian Bogost led me to this question in reverse largely through the attempt to discern what the appeal of the model of experience he proposes might be. He raises the relevant question in the subtitle of his 2012 book, *Alien Phenomenology: Or What It's Like to Be a Thing*. In a sense, being a thing is precisely what the C3 system starts to envision. Bogost proposes an object-neutral definition of experience under which we might subsume all forms of interaction in terms of an expression familiar to the denizens of the data mine: the monitoring of the 'exhaust' of things. As Bogost puts it, 'The experience of things can be characterized only by tracing the exhaust of their effects on the surrounding world' (2012: 100). That is, things can only experience other things by tracing their 'exhaust' – and their own experience is whatever reaction they might have to this exhaust, a reaction that generates further exhaust. We might describe this as the meta-datafication of everything, a sensor-based model of experience, insofar as anything that is, in any sense, impacted by anything else becomes in the broadest interpretation of the term, a sensor. I'm inclined to push this reframing a bit farther and call it a kind of drone experience, in part because of the agentic sense with which Bogost infuses this flattened-out concept of experience, in part because of his fascination with various imaging technologies, and in part because of the treatment of the object as a probe: the attempt to experience the experience of the object that motivates the analysis.

The drone model of experience invokes the notion of a sensor-database-algorithmic formation that might be summed up by using the figure of the drone broadly construed: not just in the form of a flying, weaponised, surveillance device, but as the combination of a distributed sensor equipped with automated data analysis and response capabilities. Discussions of 'big data,' 'data mining,' and new forms of monitoring and surveillance often emphasise the figure of the database: the place where the data is stored, rather than that of the infrastructure that makes data collection possible. In part this is because of the distributed and heterogeneous character of the various sensors that comprise the monitoring 'assemblage' – but in part it is because of what might be described as the turn away from infrastructure that has characterised the fascination with so-called 'immaterial' forms of activity. This turn is echoed in the rhetoric of immateriality that characterises discussions of the 'cloud' (in 'cloud computing') and cyberspace more generally. Such formulations are symptomatic of anti-infrastructural thought. The figure of the drone, by contrast, focuses attention back upon the interface device that serves as mediator for information collection, automated analysis, and automated response at a distance.

The underlying claim here is that one of the reasons the figure of the drone has so rapidly captured the popular and media imagination is that, in addition to reviving what might be described as the ballistic imaginary once associated with technological gadgetry (in the Popular-Science vision of personal jet packs and rocket-ships), it encapsulates the

emerging logic of portable, always-on, distributed, ubiquitous, and automated information capture: the droning of experience and response. The promise of the drone as hyper-efficient information technology is four-fold: it extends, multiplies, and automates the reach of the senses or the sensors, it saturates the time and space in which sensing takes place (entire cities can be photographed 24-hours a day), it automates the sense-making process, and it automates response. In this regard, the figure of the drone, generalised, stands for that of the indefinitely expandable and distributable probe that foregrounds the seemingly inevitable logic of algorithmic decision-making. The model of the signature strike (directed toward targets that ‘fit a profile’ rather than uniquely identified targets – that is, named and identified individuals) is an increasingly familiar one in the realm of data mining generally – whether for the purposes of health care, surveillance, marketing, policing, or security. Identification takes a back seat to data analytics: one needn’t know the name of a particular individual to target him or her, merely that he or she fits the target profile. This is why the category of Personally Identifiable Information is becoming an increasingly vexed one. Data analytics are subsumed and accounted for by the broader ensemble represented by drone logic, which unites sensing, analytics, and response. The figure of the drone, then, serves as icon of the (inter)face of new forms of monitoring, surveillance, and response: an exemplar of emerging forms of digital ‘interactivity.’

It is with this broader conception of the drone in mind that we might approach the affective frontier of data collection and monitoring: the fascination with so-called mood monitoring and sentiment analysis. The hallmark of the drone as a material object is – like so many of the digital devices that have come to permeate the daily life of technologically saturated societies – its mobility and miniaturisation, that is, its anticipated efficiency as ubiquitous, always-on probe. We might use the notion of the signature strike and its analogue in target marketing as an example: identification falls by the wayside, as do those aspects of the legacy version of experience associated with accounts of intentionality, motivation, and desire in ways that recall Chris Anderson’s paean to the power of big data: ‘Out with every theory of human behavior, from linguistics to sociology. Forget taxonomy, ontology, and psychology. Who knows why people [and things] do what they do? The point is they do it, and we can track and measure it with unprecedented fidelity’ (2008). Such logic, like the signature strike, isn’t interested in biographical profiles and backstories, it does not deal in desires or motivations: it is post-narrative in the sense conjured up by Bogost as one of the virtues of Object Oriented Ontology: ‘the abandonment of anthropocentric narrative coherence in favor of worldly detail’ (2012: 42).

Experiencing the data flow becomes, necessarily, the job of various kinds of distributed objects. Perhaps this is the appeal of Bogost’s theory in the digital era: the excavation of the forms of post-human experience that characterise automated data collection. The interest in capturing all available data – as exemplified by a fascination with open-ended,

random lists – embraces what Bogost describes as ‘a general inscriptive strategy, one that uncovers the repleteness of units and their interobjectivity’ (2012: 38). He calls this process ontography: the writing of being, which ‘involves the revelation of object relationships without necessarily offering clarifying description of any kind’ (2012: 38). This formulation bears a certain resemblance to Anderson’s diagnosis of the ‘end of theory’ wherein data mining might generate actionable but emergent information that is both unpredictable and, inexplicable (in the sense that it neither needs nor generates an underlying explanatory model).

The defining attribute of the kind of ‘knowledge’ envisioned in Anderson’s Big Data manifesto is the process of emergence itself – the fact that data mining by definition generates un-model-able outcomes and thereby puts emergence to work. So we start to see the outlines of a particular form of so-called knowledge emerging: a post-comprehension, post-referential (in the sense of referring to an underling cause or explanation), data-exhaust driven way of ‘knowing.’ It is with this in mind that I want to turn to the theme of emotion and relate it to the non-human version of materiality outlined by, for example, Jane Bennett (2009). She describes a version of affect that is, ‘not only not fully susceptible to rational analysis or linguistic representation but that is also not specific to humans, organisms, or even to bodies: the affect of technologies, winds, vegetables, minerals...’ (61). This is a version of affect that manifests itself in the form of exhaust described by Bogost and that, I think, lends itself to emerging, data-driven strategies of post-narrative analysis: tracing the exhaust of an unfolding litany of actants and interactants: of complex webs of interactions ‘too big to know,’ as David Weinberger (2011) puts it.

Bennett’s (2009) version of the endless unfolding of material detail surely expands beyond the realm of narrative containment – the ongoing chain of connections toward which her account gestures is both breathtaking and frustrating. Any outcome is the result of potentially infinite array of agentive factors. Her (inadvertently) complementary gesture to the ‘end of theory’ manifesto is a post-theoretical fascination with a kind of infinite regression: the attempt to contain everything so as to eschew the ostensible evils of abstraction. The growing reach of the big data database and the breadth of Bennett’s ambition to take into account what she describes as ‘an interstitial field of non-personal, ahuman forces, flows, tendencies, and trajectories’ (61), share a conserved impulse toward totality, although Bennett retains the model of narrative closure while frustrating it utterly. The prospect of unfolding the full list of participants in a particular event or outcome is an ongoing one. Similarly, the database in its ideal-typical form approaches the levelling, allegedly democratising ambition of Bennett’s vibrant materialism, allowing a promiscuous jumble of factors to rub shoulders.

With these affinities in mind – between correlational forms of data mining and post-narrative, post-explanatory modes of analysis, the remainder of this article sets out to explore their relevance to the topics of affective computing and sentiment analysis and the role of so-called mood reading in the process of affective modulation (Clough, 2009). Consider some examples from the realm of mood-mining as one frontier of data collection in the service of so called affective computing. Microsoft's 'MoodScope' initiative seeks to turn smart phones into mood sensors, not by adding a dedicated sensor, but by tracking usage patterns and their correlation with self-reported mood. By correcting their models over time, the researchers eventually automate the prediction process and claim to move from 63 percent accuracy to 93 percent accuracy (LiKimWa, 2012: 1). As the project's researchers put it, 'we find smart phone usage correlates well with users' moods...Users use different applications and communicate with different people depending on their moods. Using only six pieces of information, SMS email, phone call, application usage, browsing and location, we can build robust statistical models to estimate mood' (LiKimWa, 2012: 2). Of course, the goal of inferring mood is, for Microsoft a commercial one that serves the generation of recommendation algorithms and marketing strategies that monitor and influence shifting consumer preferences.

We might describe the MoodScope as partaking of drone logic (and drone experience): it envisions a network of mobile, distributed, always-on sensors that underwrite automated forms of data collection, processing and response (targeting). The invocation of 'mood' should not distract – it is a placeholder that does not refer to an underlying state but simply to pattern of correlations: the nexus of a particular set of behaviours (as monitored by smart phone sensors) and the measured probability of a particular response. The next logical step for the development of such an app is to bypass the placeholder of 'mood' altogether, simply extrapolating from patterns of activity to predict susceptibility to particular prompts and appeals during particular times within specified contexts. This modality of prediction or influence operates at a machinic level, linking flows of activity to patterns of response in order to get something done (generate a response or action of some kind). The point is not interpretation (of mood, subjective state, evidence of desire) but intervention in flows of viewing, clicking, spending, consumption. This way of thinking lends itself to the machinic imaginary of scholars such as, for example William Bogard (1998), who quoting Deleuze and Guattari, notes that, 'The social machine... is literally a machine, irrespective of any metaphor, inasmuch as it exhibits an immobile motor and undertakes a variety of interventions: flows are set apart, elements are detached from a chain, and portions of the tasks to be performed are distributed' (54). The notion of an 'immobile motor' neatly invokes the figure of the 'exhaust' of things. The process of 'sensorisation' works to codify these flows for the purpose of intervention. As Daniel Smith (2007) puts it, these networks of affect (and the information networks through which they flow) become 'infrastructural': 'They are, if I can put it this way, part of the capitalist infrastructure; they are not simply your own individual mental or psychic reality. Nothing makes this more obvious that the effects of marketing, which are directed entirely at the

manipulation of the drives and affects: at the drug store, I almost automatically reach for one brand of toothpaste rather than another' (74).

The infrastructure of affect continues to be 'built out' by the growing platform of affects apps. Apple has already patented technology that relies on an embedded tactile heartbeat sensor to identify users and monitor their moods (Calorielab, 2010). The technology combines the promise of convenience with enhanced monitoring capability: the phone can be unlocked just by picking it up, but the monitor, unlike a fingerprint scanner, simultaneously gathers information to potentially serve a host of marketing, security, and medical functions. As one news account put it, 'By monitoring your heartbeats, the device will also be able to tell how you're feeling (better than you can tell yourself, presumably), what you've been eating and if you've just come back from a jog' (Calorielab, 2010). The vectors for capturing, monitoring, and intervening in the flows that link 'mood' and response are multiple and expanding alongside the various registers of interactivity: they piggyback on multiplying applications and the behaviour patterns these elicit.

Similarly, the company that developed the technology that powers Apple's Siri is working on adding voice recognition ID systems that simultaneously incorporate mood detection. Soon Siri will respond not just to what you say, but to its conception of how you feel. Once again the promise combines convenience with the prospect, at least in this case, of commercial monitoring. As an interview with the company's marketing chief put it: 'If your car thinks you sound stressed, it may SMS your office to say you're late or even automatically suggest another route that avoids traffic' (Eaton 2012). But the company is looking to monetise the technology: 'What if when you ask Siri for information about a movie, she works out that you're sad and recommends a comedy film that you otherwise wouldn't have seen, paired with an ad campaign?'

And the litany of mood apps goes on: MIT has spun off a company called Affdex that uses facial recognition technology to gauge emotional response. It has been used by companies like Forbes to crowdsource reader's responses to ads shown on the company's website. Yes, soon not just the TV, but the ads, the music, the magazines and books will be watching, analysing, and responding in the affective register. A company called Sensus develops apps that use galvanic skin response to measure stress levels. Microsoft is building emotion recognition into its Kinect device, so that next-generation games (and, yes, ads) will be able to react to facial expressions and monitor heart rate. The anticipated result is, as a somewhat breathless account puts it, that 'games will react to your emotionality, and even your cars will route you to entirely new destinations based on how you're feeling. The next generation of advertising will determine how you're feeling... And it's not just the question of detecting your mood, it's all about how this leads the

person expressing the mood to discover new information' (Eaton, 2012). It also leads to the prospect of more effectively sorting, targeting, and influencing in a variety of registers for a range of purposes.

Coming full circle, security is one of the pioneering and recurring applications of affective monitoring, thanks in no small part to department of homeland security funding. The DHS, has funded Cambridge-based Draper Labs 'to develop computerized sensors capable of detecting a person's level of "malintent" – or intention to do harm' as part of the 'Future Attribute Screening Technologies,' program (Segura, 2009). The goal is to, 'detect subjects' bad intentions by monitoring their physiological characteristics, particularly those associated with fear and anxiety,' according to the DHS (Segura, 2009).

Possible technological features of FAST include 'a remote cardiovascular and respiratory sensor' to measure 'heart rate, heart rate variability, respiration rate, and respiratory sinus arrhythmia,' a 'remote eye tracker' that 'uses a camera and processing software to track the position and gaze of the eyes (and, in some instances, the entire head),' 'thermal cameras that provide detailed information on the changes in the thermal properties of the skin in the face,' and 'a high resolution video that allows for highly detailed images of the face and body ... and an audio system for analyzing human voice for pitch change' (Segura, 2009). The project is based on another DHS project called 'Hostile Intent,' which 'aims to identify facial expressions, gait, blood pressure, pulse and perspiration rates that are characteristic of hostility or the desire to deceive' (Segura, 2009).

Researchers are developing applications that claim to be able to identify a person's emotional state by listening in on mobile phone conversations. Some companies in the United States already use the system in their call centres. Researchers are testing the software's use in diagnosing medical conditions like autism, schizophrenia, heart disease and even prostate cancer (DiscoveryNews, 2013). One could continue indefinitely in this register: since emotion detection covers the gamut of securitisation applications: economic, criminal, health, social and so on. And the sensor array proliferates on the various forms of drone devices, broadly construed, that circulate amongst us, upon us, with us.

It is just one step from these examples to what might be described to the redoubling of drone logic: equipping drones with 'malintent-detection' sensors. Drones already target strikes based on mobile phone signatures, using the device to identify a particular individual. But drone logic pushes beyond strategies of identification in which a device comes to represent a particular target to strategies of pre-emption in which a device

identifies potentially threatening or risky affective states with the potential to result in action.

In this regard, the invocation of terms like mood, emotion, or sentiment (or even ‘malintent’) is not meant to speak to a particular conception of subjective interiority nor even to have any definitive discernable stable referential content, but rather to mark the intent of detecting, predicting, and influencing response in a register other than that of reflexive, self-conscious communication – indeed to, in a sense, bypass this register in any respect other than as a potential source of more raw material for pattern analysis. The promise of bypassing this register is to bypass the vagaries, pathologies, deceptions, and self-deceptions of self-consciousness: to read affective response directly and thereby to develop strategies for intervening in it. In this context, speech, to take an example, is not about content, but about voice stress, or detectable word patterns that correlate with signature patterns – as in a signature strike. That is, the strategies of influence mobilised in response to detected ‘emotional’ states may take the forms of standard types of communication, but the register in which their potential effectivity is posited is other than the ideological – the narrative, the content-based. In Papoulias and Callard’s (2010) formulation, the intervention, ‘is seen as proceeding directly from the body – and indeed between bodies – broadly construed here – without the interference or limitation of consciousness, or representation’ (37).

In her critique of the turn to affect, Ruth Leys characterises the split at work here in terms of the, ‘presumed separation between the affect system on the one hand and signification or meaning or intention on the other’ (2011a: 800). It is a presumption she is concerned about not least because it smuggles in the very binaries these theorists imaged they had surpassed: ‘in spite of their explicit hostility to dualism, many of the new affect theorists succumb to a false dichotomy between mind and body’ (2011a: 801). This dualism is characteristic of ‘post-comprehension’ strategies of influence and ‘literacy’ (brain reading and body reading). The ‘mind’ (intentional, conscious, available for rational cognition) may have gotten much of the attention when it comes to information processing and communication, but the body’s language is efficacious. As Leys puts it, affect is figured as ‘prior to ideology’: ‘an inhuman, nonsignifying force that operates below the threshold of intention, consciousness, and signification’ (2011a: 802).

The turn to affect in the strands of theory outlined earlier is thus framed as a (re)turn to the body as subsumed to the status of object with particular types of experience, that take into account what Thrift describes as, ‘the way that political attitudes and statements are partly conditioned by intense autonomic bodily reactions that do not simply reproduce the trace of a political intention and cannot be wholly recuperated within an ideological regime of

truth' (as quoted in Leys, 2011b: 436). This model of affective communication as immediate influence is rehabilitated not least in the strategies of neuromarketers and the sentiment analysts (as is the temporal and conceptual split between affective response and post hoc rationalisation: the attempt to narrativise the impulse that always comes after the fact). Although data mining is agnostic about this split, allegedly eschewing models of causation and explanation, in this very refusal it has already chosen sides.

Something related takes place in the development of so-called sentiment analysis: the attempt to data mine expressed sentiment on the social web in real time so as to intervene and influence an aggregate conception of the internet's 'feeling tone.' The field is popularly described as one in which, 'the vagaries of human emotion are translated into hard data' (Wright, 2009). But this description is not quite right: the goal of marketers is not to gauge personal, individual 'human' emotion, but rather to probe an affective landscape without having to pore over the individual contributions of millions of Internet users. Sentiment analysis relies on technological advances that make it possible to sift through all these forms of expression, to treat them as measurements of a capability to affect or a susceptibility to influence, without actually reading them. The goal is a kind of thin-slicing or pulse-reading of the Internet as a whole. Pioneering companies in the field develop applications that troll through twitter feeds, blogs, social networking sites, online forums, bulletin boards, and chat rooms, probing the emotional pulse of the Internet. The industry places a premium on speed and volume: processing as many posts and messages as possible in real time.

As in the case of the app examples, the model is not a descriptive, referential one (that would aim to accurately describe how individuals are feeling) but a predictive, correlational one. Applied to sentiment analysis, the goal of data mining is both pre-emptive and productive: to minimise negative sentiment and maximise emotional investment and engagement: not merely to record sentiment as a given but to modulate it as a variable and thereby to influence the forms of behaviour with which these shifts are associated. The process relies on giving 'populations over to being a probe or sensor' (to borrow Patricia Clough's formulation) to provide the raw material for tracking the emotional indicators that correlate with desired outcomes – and for developing ways of exploiting them (Clough, 2009: 53).

What is suggestive about the proliferation of apps in the affective register is the way they redouble all content in the form of post-content 'knowledge.' Recall the goal of MoodScope or the FAST program: not to read all messages, or listen to all calls, but to piggyback on content to get machine-sortable metadata: you may use your apps or your email to collect information or communicate with others, but these uses generate patterns that,

without your conscious knowledge communicate a user state (and an aggregate state) that can then be correlated with your responses. We might describe this monitoring logic as the meta-datafication of everything: content becomes metadata, when it is not read (for significance), but sorted, mined, and correlated (for useful patterns). This is why no human at Google reads your email. Such applications use the placeholder of mood, or affective state, to generate correlations that underwrite more direct modes of influence – techniques for enhancing the power of acting or being acted upon. That is, the goal is to define a state of receptivity in which the broadened and flattened conception of experience allows all kinds of collected data to commingle. The result is a litany of content – in its machine-readable form – including patterns of search, typing speed, Web sites visited, patterns of communication (who one emails, how frequently), movement throughout the course of the day, barometric pressure, sunspots (why not?), magnetic fields, and on and on, limited only by the capabilities of the growing sensor array. I am using the term post-comprehension, somewhat freely here, to designate the forms of too-big-to-know knowledge that represent the displacement of causation or explanation by correlation. The descriptor ‘post-comprehension,’ then refers to the goal of discerning patterns that are neither conscious nor meaningful to users. The term refers also to the detection of receptivity to particular influences – whether such and such a ‘mood’ – or, more properly speaking, the patterns of use which the placeholder of mood is meant to designate – correlates with a heightened tendency to respond in particular ways. Additionally the notion of post-comprehension refers to the fact that the generation of these patterns is portrayed as an emergent one, and is, in this respect, unmodellable, unanticipatable, and potentially, un-reverse-engineerable. Why post-comprehension and not pre-comprehension? Because the goal of explaining is not deferred but dispensed with: there is no background assumption that in the end, the infinite database will yield total comprehension. Once everything is coded, it is not understood, but simply processed: the ongoing interventions of the (total) immobile motor.

These forms of opacity, or unmodellability characterise the emerging asymmetries of a big data divide. From a research perspective, Boyd and Crawford (2012) have characterised the divide between ‘the Big Data rich’ (companies and universities that can generate or purchase and store large datasets) and the ‘Big Data poor’ (those excluded from access to the data, expertise, and processing power), highlighting the fact that a relatively small group with defined interests threatens to dominate and control the research agenda. The notion of a ‘big data divide’ needs to be extended to incorporate a distinction between ways of thinking about data and putting it to use. That is, it needs to acknowledge the consequences of emerging forms of opacity and asymmetry: between those who are able to put to use the unanticipatable and inexplicable correlations generated by the data mining process and those who are subject to the forms of sorting and exclusion they license. This is also a divide between those who seek to exploit detected correlational patterns of affective response and those whose actions are subject to the forms of

inferential data mining enabled by the growing sensor array and the expanding database.

Despite the rhetoric of personalisation associated with data mining, it yields predictions that are probabilistic in character, privileging decision making at this level. Moreover, it ushers in the era of what might be called emergent social sorting: the ability to discern un-anticipatable patterns that can be used to make decisions that influence the life chances of individuals and groups. Notions like that of 'informed consent' when it comes to online tracking and other types of digital-era data surveillance are rendered largely meaningless by the logic of data mining, which proposes to reveal unanticipated and unpredictable patterns in the data. At a deeper level, the big data paradigm proposes a post-explanatory pragmatics (available only to the few) as superior to the forms of comprehension that digital media were supposed to make more accessible to a greater portion of the populace.

In this regard, the privileging of correlation and prediction – like the figure of the drone – leads us back to issues of infrastructure. If, as Weinberger (2011) puts it, the smartest person in the room is the room, in the era of post-comprehension knowledge, it matters who owns, operates, and controls the room. It is worth emphasising that such forms of asymmetry and opacity are the specific goal of so-called affective forms of context awareness. At the moment when access to traditional forms of understanding and evidence is enhanced by the new technology, these are treated as ostensibly outdated.

Practices of data-driven affect mining anticipate a context in which only the few will have access to useful forms of 'knowledge' that are not just unavailable to the majority, but incomprehensible. Thus, there is no way for individual users to anticipate how information about them might prove salient for particular forms of decision-making. Isn't this the endgame logic of the 'unmanned' LAW? The figure of the drone augurs not simply prosthetic enhancement but displacement: the cultivation of forms of automation that result not simply in synthetic perception (Virilio, p. 58), but in synthetic action. In this regard, the figure of the drone comes to stand for a particular kind of alienation: of perception and practice that is becoming increasingly familiar in our auto-sorted, curated, algorithmically directed information environment. We come to experience the re-processing of our actions, desires, and responses in an unrecognisable form directed back upon us in the service of ends built into the infrastructure. In the contemporary theoretical climate, the familiar critique of alienation (as a critical conceptual tool) is that it introduces an outdated form of (pre-post-) humanism (and thus, of the subject). When everything is alien, alienation, of course evaporates. What if the critique of alienation invokes, rather, the spectre of what Smith refers to as 'an ethics of immanence' that will criticise anything that 'separates a mode of existence from its power of acting' (2007, 68)? Rather than proposing the alien

as a starting point, in the face of the developments outlined above, why not alienation? To invoke Guy Debord's diatribe against Jean-Marie Domenach's dismissal of the very concept of alienation: 'Let us speak vulgarly since we're dealing with priests: alienation is the point of departure for everything — providing that one departs from it' (Situationist International, 1966).

Biographical Note

Mark Andrejevic teaches and writes about popular culture, surveillance, and digital media. He is the author of *Infoglut: How Too Much Information is Changing the Ways We Think and Know*, as well as two other books and a variety of articles and book chapters. He is currently writing about the droning of the social.

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